ENVIRONMENTAL ASSESSMENT
SANDBRIDGE BEACH EROSION CONTROL
AND HURRICANE PROTECTION PROJECT
VIRGINIA BEACH, VIRGINIA
Draft

Prepared by
U.S. Army Corps of Engineers, Norfolk District
Planning and Policy Branch
Environmental Analysis Section

In cooperation with

Minerals Management Service
Leasing and Environmental Divisions

April 2009

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FINDING OF NO SIGNIFICANT IMPACT
SANDBRIDGE BEACH EROSION CONTROL AND
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I have reviewed and evaluated the Environmental Assessment (EA) for this project in terms of the overall public interest. The possible consequences of the alternatives (including the no action plan) were considered in terms of probable environmental impact, social well-being, and economic factors. This EA was prepared in cooperation with the U.S. Department of Interior, Minerals Management Service to present the impacts that could potentially result from beach nourishment of the oceanfront at Sandbridge and the associated source of beach borrow material for continuing beach nourishment and hurricane protection. Beach nourishment would involve an area approximately 5 miles long and 125 feet wide. The project dimensions include a 50-foot wide berm at an elevation of 6 feet North American Vertical Datum with a foreshore slope of approximately 1:20 (one vertical value to 20 horizontal) for a distance of approximately 5 miles. The designated borrow site is Sandbridge Shoal, located approximately 3 nautical miles from the shoreline, outside of Virginia's territorial sea.

During the preparation and coordination of this EA, the environmental impacts of the project were not found to be significant. There would be some loss of benthic organisms at the dredging and beach placement sites, and some aquatic habitat would be replaced by a beach berm. Dredged material (sand) is compatible with the existing substrate along the Sandbridge Beach shoreline. Previous monitoring studies indicate that benthos would reestablish readily in intertidal and subaqueous areas, and interstitial organisms would reestablish readily in the nourished beach. Based upon previously monitored projects, water quality impacts are expected to be short-term and minor during construction.

Some adverse effects on threatened and/or endangered species and/or species of special concern are foreseeable with project implementation. These adverse effects will be substantially minimized with the implementation of various monitoring measures and other precautions now standard in oceanic hopper dredging. With these provisions in place, the proposed project is "not likely to jeopardize" the continued existence of threatened and/or endangered species. Previous Endangered Species Act, Section 7 consultation, concluded with a NMFS Biological Opinion dated April 2, 2003. The Incidental Take Statement was updated in 2001 following new information on sea turtles resuscitation, hopper dredge interactions, and reporting requirements. Recent coordination with the NMFS in December 2007, concluded that the current ITS and BO remain valid for the upcoming dredging and beach nourishment operations provided Norfolk District adheres to all reasonable and prudent measures and terms and conditions as outlined in the 2001 ITS and 1993 BO. The project will comply with conditions contained in this Biological Opinion. The USFWS issued letter dated, October 10, 2008 stating if the previously mentioned protective measures are followed, the proposed action is not likely to adversely affect Federally listed or proposed species or their critical habitat.

The proposed project has been evaluated under the Clean Air Amendments of 1990. The evaluation indicates that no significant degradation of air quality will occur, as compared with the no-action alternative, and, thus, the project will comply with Section 176 (c) of the Clean Air Amendments of 1990.

Since the no action alternative would result in loss of the beachfront berm, and compromised hurricane and storm protection at the Sandbridge Beach oceanfront, this alternative was not chosen. The economic and social benefits of the dredging of beach quality material from offshore sources and beach placement of sand are considered greater than the environmental effects that would result from the implementation of the recommended plan.

The conclusions of this assessment are based on an evaluation of the effects that the proposed action would have on the entire ecosystem, including the land, air, and water resources of the Atlantic Ocean. Cumulative impacts of other activities were also considered in this evaluation. Implementing the proposed alternative would not have a significant adverse effect on the environment. Design features and best management practices that will minimize adverse impacts have been incorporated into the project. The effect of the proposed action will not be environmentally controversial.

Due to the absence of significant adverse environmental impacts, an Environmental Impact Statement will not be required.

Date	Dionysios Anninos Colonel, Corps of Engineers

Draft

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1.0 INTRODUCTION

Sandbridge Beach is located on a barrier island, along coastal southeast Virginia separating the Atlantic Ocean on the east from Back Bay, a shallow freshwater sound, to the west. It is a residential community of year round residents, rental properties, and summer homes located approximately 5 miles south of Virginia Beach's "resort strip." Several major storms, nor'easters, and hurricanes have struck the area in past years causing severe losses of sand and coastal flooding; the oceanfront is susceptible to wave attack on the beach berm and dunes. During the initial development of Sandbridge as a residential community, sand dunes were lowered, and in some cases, removed for construction near the shoreline. A Phase I Advanced Engineering and Design Study for Beach Erosion and Hurricane Protection at Virginia Beach, including Sandbridge Beach, was authorized by Section 1(a) of the Water Resources Development Act of 1974 (Public Law 93-251, 93rd Congress, H.R. 10203, 7 March 1974). In March 1992, the U.S. Army Corps of Engineers (USACE) completed a Final Feasibility Report and Environmental Assessment (EA) for Sandbridge evaluating economic, engineering, and environmental concerns. Beach nourishment actually began in 1998, partially funded through a Special Service Tax District (SSD) where property owners pay an extra $0.06 property tax per $100 assessed property valuation for beach fill. The Sandbridge SSD funds, in addition to hotel taxes and other sources, go into a fund which provides the city's share of funding for long-term Federal beach restoration and maintenance projects (City of Virginia Beach, 2007); the Federal government contributes up 50% of the costs.

This EA was prepared by USACE, Norfolk District in cooperation with the U.S. Department of Interior, Minerals Management Service (MMS), to present the impacts that could potentially result from beach nourishment of the oceanfront at Sandbridge and the associated source of beach borrow material for continuing beach nourishment and hurricane protection. Several beach nourishment projects have been completed since original construction; the most recent USACE project concluded in October 2007. The MMS prepared supplemental EA's in 1997, 2001, and 2006 to support the extraction and use of Outer Continental Shelf (OCS) sand from Sandbridge Shoal. The MMS found no significant impacts for the three previous dredging cycles, provided that identified mitigation measures were implemented. The purpose of this (updated) EA is to evaluate whether the proposed action has the potential for creating significant impacts to the environment, and consider any changes to the affected environment that may have occurred since the original EA, and would thereby warrant a more detailed study on impacts, mitigation, and alternative courses of action. The original EA was prepared by USACE in 1992 and resulted in a Finding of No Significant Impact. The evaluations are based on Federal, State, and local statutory requirements and an assessment of USACE environmental, engineering, and economic regulations and criteria.

2.0 NATIONAL ENVIRONMENTAL POLICY ACT of 1969 (NEPA) CONSIDERATION

The NEPA and Title 40 of the Code of Federal Regulations, Parts 1500-1508 (40 CFR 1500-1508) require Federal agencies to consider the potential environmental consequences of proposed actions and alternatives. Executive Order (EO) 11514, Protection and Enhancement of Environmental Quality (amended by EO 11991), provides a policy directing the Federal government to take leadership in protecting and enhancing the environment.

The MMS has jurisdiction over mineral resources on the Federal Outer Continental Shelf (OCS). Public Law 103-426, enacted October 31, 1994, gave MMS the authority to convey, on a noncompetitive basis, the rights to OCS sand, gravel, or shell resources for shore protection, beach or wetlands restoration projects, or for use in construction projects funded in whole or part or authorized by the Federal government. The USACE invited the MMS to participate as a cooperating agency pursuant to 40 CFR 1501.6. As a cooperating agency, the MMS participated in the scoping process and developed information and prepared environmental analyses for which MMS had special expertise. The MMS also participated in: the required Endangered Species Act (ESA) Section 7 consultation; the Magnuson-Stevens Fishery and Conservation Management Act Essential Fish Habitat consultation (Section 305); the National Historic Preservation Act (NHPA) Section 106 process; and the Coastal Zone Management Act Section 307 consistency process.

3.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the proposed action is to provide protection from erosion induced damages including limited protection to the beach and to residential structures from storm damage. The Sandbridge oceanfront is vulnerable to direct wave attack during storms when greater than normal tide levels overtop the backshore. The city of Virginia Beach, in its April 2002 Beach Management Plan, identified Sandbridge Beach as “having extremely high erosion rates….and damage to private property and public infrastructure from storm events has occurred with increasing frequency and cost.” Renourishment would reinforce the beach berm in anticipation of northeasters and hurricanes over the 50-year project life.

4.0 DESCRIPTION OF THE PROPOSED ACTION

The proposed action would involve beach nourishment at the Sandbridge oceanfront, an area approximately 5 miles long and 125 feet wide. The specific beach area covered extends from the U.S. Naval Fleet Anti-Air Warfare Training Center at Dam Neck to the north to Back Bay National Wildlife Refuge to the south (Figure 1). The project dimensions include a 50-foot wide berm at an elevation of 6 feet North American Vertical Datum (NGVD) with a foreshore slope of approximately 1:20 (one vertical value to 20 horizontal) for a distance of approximately 5 miles (Figure 2). The designated borrow area is Sandbridge Shoal, located approximately 3 nautical miles from the shoreline, outside of Virginia’s territorial sea (Figure 3). There are two selected borrow areas within Sandbridge Shoal, Area B to the north and Area A to the south; depths range from 30 to 65 feet. The area between the two borrow areas is off limits due to the presence of a buried Navy submarine communications cable. Beach quality sand would most likely be removed by trailing suction hopper dredge. The hopper dredge is equipped with dragheads and a hopper which collects sand. When the hopper is full, material is transported to a pump out buoy located offshore (Figure 4). The material would then be pumped through a discharge pipeline, which runs along the ocean floor, and up onto the beach where bulldozers and graders will distribute the material. Approximately 1.5 to 2.0 million cubic yards (cy) of beach quality sand would be placed on the beach approximately every 3 years depending upon weather conditions, availability of funding, and behavior of subsequently placed material at the project site. The cycle may occur less often, but probably no less than once every 5 years.

5.0 ALTERNATIVES TO THE PROPOSED ACTION

5.1 Structural and Non-structural. Alternatives that were presented, evaluated, and ultimately eliminated in the previous EA (prepared in 1992) and given consideration in this (updated) EA incorporated both structural and non-structural plans.

5.1.1 Hard Structure Alternatives. The structural plans included seawalls, offshore breakwaters, groins, and a combination of seawalls and raising the beach berm. A massive seawall would be effective in minimizing tidal flooding damage to structures behind the seawall; however, consideration was given to the proposed structure’s effect on the fronting beach. If the beach were lost, the seawall would be vulnerable to wave attack. An offshore breakwater plan was evaluated in a previous district report and determined to be unfeasible because of cost; protecting the entire shoreline would require thousands of feet of massive breakwater. A system of groins could reduce erosion at the beach, although such a measure would not be compatible with the recreational uses at Sandbridge. A combination of seawall construction and raising the beach berm could provide for increased storm protection and an effective hurricane protection measure but was determined not to be cost effective for the entire project length.

5.1.2. Non-Structural Alternatives. The non-structural plans considered flood plain regulations, flood proofing and permanent evacuation, and forecasting warnings. The City of Virginia Beach has flood plain regulations that control the type and locations of development along the shoreline, which is an important measure to control and limit the potential for future damage. Flood proofing would not have any impact on the existing erosion problem, and permanent evacuation would not be acceptable to the local residents and is not economically justified. There is an evacuation route from Sandbridge and residents, tourists, and business proprietors receive warnings from the National Weather Service by radio and television on predicted storm events.

Neither one nor a combination of the alternatives discussed above provided an acceptable solution in terms of feasibility and/or economics, environmental, and technical concerns, to the existing beach erosion and hurricane protection needs. Thus, the structural and non-structural alternatives were eliminated from further consideration as a viable solution to coastal erosion and storm problems at Sandbridge Beach.

5.2 No Action Alternative. Implementation of the no action alternative would result in continued degradation and erosion of the oceanfront, which is exposed to high wave energy during storm events. The average erosion rate is estimated to range from about 250,000 cy to 350,000 cy per year. The highest erosion rates occur in the mid-part of the project area between Dam Neck and the fishing pier. An erosion rate over the 50-year planning period is expected to approximate that of the historical average (USACE, 1992). Both Category 1 and Category 2 storms have struck the Virginia Beach coastline from 1994 to 2004; thus, it is likely that over the next several decades more such storms can be anticipated. Although the occurrence of two storms, Category 1 or above, striking the coastline in a single season is rare, multiple northeasters striking the coastline in a single season is far more common and can result in significant beach erosion. Without a project, storms would continue to inflict expensive damages from erosion and storm surge along the oceanfront, and large portions of the beach would continue to be vulnerable. Therefore, the "no action" alternative was deemed unacceptable and not considered further.

6.0 AFFECTED ENVIRONMENT

6.1 Environmental Setting:

6.1.1 Climate. Virginia Beach is temperate with moderate seasonal changes. Winters are generally mild, and summers, though long and quite warm, are frequently tempered by cool periods resulting from winds off the Atlantic Ocean. The average annual temperature in the city is 60 degrees Fahrenheit. Average annual precipitation is 44.63 inches with even distribution throughout the year; average monthly amounts range from 5.74 inches in July to 2.62 inches in November. Droughts, when they occur, are more common in summer months. The Bermuda High, located in the North Atlantic's subtropical gyre, produces southwesterly winds during summer with speeds of 2 to 3 meters (m) per second. In winter, that same system weakens and moves southwardly. The Icelandic Low system, located in southern Greenland, creates winds that move west to northwest with speeds averaging 3 to 5 m per second in winter.

Hurricanes, tropical storms, and northeasters occasionally occur within the project area. Hurricanes and tropical storms are less frequent and are seen only during the summer and fall months, as they are generated by air mass collision dynamics in the tropical latitudes. Northeasters can occur during any season, but normally occur during the winter, spring, and fall and are more numerous than hurricanes and tropical storms. All three are capable of causing expensive beach erosion and rapid seaward movement of beach sand.

6.1.2 Geology and Soils.

6.1.2.1 General Vicinity & Placement Site. Virginia Beach is a nearly flat city with an average elevation of 12 feet above sea level. In its former natural state, it was bisected by about a dozen creeks, bays, and inlets with fringe marshes and limited acreage of adjacent nontidal wetlands. In addition, the inland areas of Virginia Beach are comprised of a mosaic of hydric soils and nonhydric soils, with hydric predominating. The sandy loam soil of the city is fertile, and a variety of crops are still harvested in the southern half of the city. Potatoes, corn, wheat, soybeans, and fruit are common products. Large areas of hydric soil in the city currently used in agriculture and timber production are termed “mineral flats” because of their lack of relief, seasonal high water tables, and perched water tables. Some of these are jurisdictional wetlands. These mineral flats support corn cultivation. Soils in the Coastal Plain were developed from unconsolidated marine sediments. The texture of these soils is generally sandy silt from flood plain deposits, clayey silt on fluvial terraces, fine silty sand on higher marine terraces, and clayey silt from Coastal Plain peneplain. These soils are deep, but their drainage characteristics range from well-drained to poorly-drained. Wetness and poor drainage are prevalent in a number of locations in the region. Low-lying and upland soils are tidal marsh and manmade land (fill material).

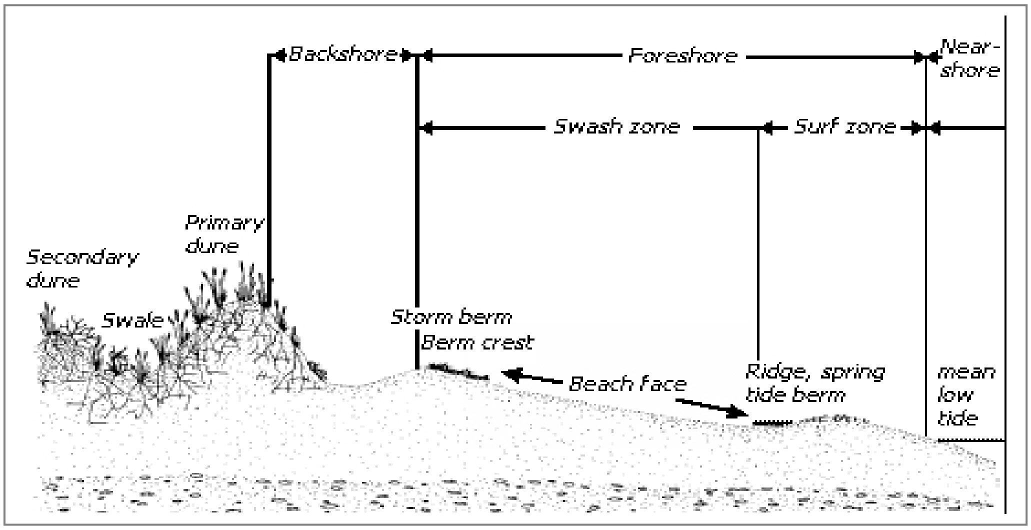
The Geologic Map of the Virginia Beach quadrangle maps the beach segment of the project area as Holocene-age sand along the coast, with marshland and Pleistocene-age Kempsville Formation (Lynnhaven Member, near shore marine sand and clay) directly to the west of the project area (Oaks, 1974). Beaches consist mostly of sandy material deposited by wave action which is subjected to daily tidal flooding. Mean grain size at the placement site ranges between 0.25 mm and 0.35 mm. The average erosion rates for the Sandbridge shoreline range from 2 to10 feet per year.

6.1.2.2 Borrow Area. Continental shelf topography offshore southeastern Virginia is dominated by ridge and swale features formed during the Holocene transgression. Many potential sand resource sites are associated with sand ridges and large shoal bodies approximately 20 km (approximately 12 miles) offshore Virginia Beach (known as the Virginia Beach Ridges) and seaward of False Cape (False Cape Ridges). Sandbridge Shoal has been identified as a high quality medium to coarse sand resource for beach nourishment along the southeastern Virginia coast, located 3 miles east of the north end of the project area (Figure 3). The horseshoe-shaped shoal is characterized as a northward and eastward thinning wedge of sand approximately 48 km^2 in area and up to 6 meters thick. Maximum relief over the ambient shelf surface is about 4 meters. The borrow area is estimated to be approximately 96 percent sand, 1.5 percent gravel, and about 2.5 percent fines (USACE, 1992). The grain size composition is compatible with the material on the existing beach and suitable as beach fill material.

6.1.3 Terrestrial Environment. Sandbridge is a barrier island separating the Atlantic Ocean from Back Bay, a shallow oligohaline bay. The bay-side is dominated by wetlands subject to irregular wind-tidal flooding along the shores that have been cut off from oceanic influences by the closure of inlets. The system is influenced by wind-driven currents and may produce as much as 1 m (3 ft) of variation in water levels and contribute to a salinity regime that fluctuates between completely fresh and salinity of about 5 ppt (VADCR, 2006). Vegetation consists of a mixture of freshwater species and few species more typical of mesohaline marshes. Patch-dominance of the tall marsh graminoids include big cordgrass (*Spartina cynosuroides*), bulrush (*Scirpus validus*), black needlerush (*Juncus roemerianus*), and cattails (*Typha angustifolia*). More locally distributed are patches of diverse short-statured marshes characterized by creeping spikerush (*Eleocharis fallax*), bull-tongue arrowhead (*Sagittaria lancifolia ssp. media*), pickerelweed (*Pontederia cordata*), and a large number of minor associates. Shallow, muck-filled pools within the marshes contain patches of American water-lily (*Nymphaea odorata ssp. odorata*). The marsh provides habitat for a diverse assortment of wildlife including snakes, otters, nutria, and waterfowl species such as geese, osprey, pelicans, herons, and swans.

Maritime forests occur on the leeward slope of bay-side dunes. This habitat is populated by a variety of plant species such as scrub pine (*Pinus virginiana*), live oak (*Quercus virginiana*), southern bayberry (*Myrica cerifera var. cerifera*), greenbriers (*Smilax rotundifolia*), slash pine (*Pinus elliottii*), and loblolly pine (*Pinus taeda*). Animals that inhabit the maritime forest include snakes, squirrels, opossums, skunk, rabbits, raccoon, and fox.

The dune and beach habitat is located ocean side of the barrier island and has distinct segments, as shown in the diagram below.



Typical Beach Profile (How Stuff Works, 2008)

The backshore is the region of a beach from the berm crest landward (to the foredune ridge, vegetation line, seawall etc.); it is typically beyond the reach of ordinary waves and tides but is influenced by wind. Common plant species include sea oat (*Uniola paniculata*), seaside goldenrod (*Solidago sempervirens*), and sea rocket (*Cakile edentula*). It is an area subject to harsh environmental and physical changes, including a wide temperature range, salinity fluctuations, and wave action that causes cycles of erosion and accretion. The beach surface presents a harsh environment as the temperature of the sand on a hot, sunny day may be extremely high, but less than an inch below the surface, the temperature is lower and more conducive to life. Thus, most permanent residents of the upper parts of the beach are burrowers and come out primarily at night (USACE, 1992). The upper beach, above mean high water, is generally dry except during storms. Storms can significantly modify the physical environment by eroding or accreting the upper beach and altering the beach animal communities. Resident species of the upper beach generally emerge from their burrows only at night; characteristic species are ghost crab (*Ocypode spp*.), sandfleas (*Talitridae*), hermit crab (*Pagurus sp*.), and sand fiddler crab (*Uca pugilator*). Many birds also use the beach for breeding, nesting, and feeding. Gulls (*Larus spp*.), sanderlings (*Crocethia alba*), fish crows (*Corvus ossifragus*), and grackles (*Quiscalus quiscula*) are the most noticeable bird species in this community.

The foreshore is the sloping portion of the beach between the limits of high tide and low tide swash which includes the entire intertidal (beach face and low tide terrace) area affected by swash and backwash. The beach face is commonly separated by a plunge step, a small trough filled with coarse sand or shells from by the breaking of small plunging waves at the base of the beach face. The foreshore is the zone that is submerged at high tide and exposed at low tide.

The nearshore is seaward of the foreshore and is submerged even at low tide. Residents of the lower beach, below mean high water, includes annelid worms, clams (*Donax spp*.), and mole crabs (*Emerita spp*.). These invertebrate species provide important ecological functions in coastal environments including cycling of organic matter and nutrition and transfer of both primary and secondary production to surf zone fishes and shore birds. As in most harsh environments, the fauna and flora are limited in number of species, often in number of individuals, and the inhabitants include many examples of extreme adaptation to a specialized way of life. Animals that live in shifting sands on marine beaches are well adapted and tolerate environmental extremes in order to feed, burrow, and reproduce.

6.1.4 Physical Oceanography. The currents of the Virginia shelf have been discussed in detail in Harrison et al. (1964), Ludwick (1978), Wright et al. (1987), Valle-Levinson and Lwiza (1998), Marmorino et al. (1999), and Lentz (2008). The driving forces include wind stress, pressure gradients, and tides (Valle-Levinson and Lwiza, 1998; Epifanio and Garvine, 2001). The relative importance of each varies by season, tidal cycle, and meteorological conditions, but mean flows over the shoreface and inner shelf are largely driven by north-northeast winds and are generally southward and along-isobath (Beardsley and Boicourt, 1981; Xu and Wright, 1998; Lentz, 2008). Mean cross-shore flows are generally onshore reflecting upwelling conditions (Byrnes et al., 2003). Northeasters and extratropical storms contribute to severe waves, strong wind-driven along-shelf flows, and enhanced, but comparatively small, across-shelf flows (Wright et al., 1991; Xu and Wright, 1998). Net and gross sediment transport is expected in the along-shelf direction. Strong wind/wave events may enhance near-bottom flows and promote offshore transport of entrained sediment. Waves, wave-induced currents, and tidal currents exert increasing influence in the surf zone and reverse the direction of net sediment transport.

The mean tidal range is approximately 1 m (3.3 ft), with a maximum spring range less than 1.5 m (5 ft). The semidiurnal tidal constituent dominates tidal forcing, and the tidal phase propagates northward along the Outer Banks, North Carolina. Off southeastern Virginia, semidiurnal tidal ellipses are strongly oriented northwest-southeast with velocities increasing shoreward, reflecting the funneling effect of the Chesapeake Bay mouth (Valle-Levinson and Lwiza, 1998). With increasing distance south of the tidally-influenced bay outflow, tidal forcing grows increasingly less important in along-shelf and cross-shelf processes (Byrnes et al., 2003). During storm conditions, coupling of wind-generated mean flows and wave orbital velocities overshadow tidal currents. Subtidal circulation responds to synoptic-scale winds, which last for 2 to 10 days and are typically associated with large-scale weather patterns. These events typically lead to strong downwelling, contributing to a southward subtidal flow (Kim et al., 1997; Marmorino et al., 1999). Surface circulation and water mass properties along southeast Virginia are dependent on outflow from the Chesapeake Bay (Beardsley and Boicourt, 1981; Lentz and Langier, 2006). Under the influence of downwelling winds or northeasterly winds blowing onshore, the buoyant discharge, dominated by tidal and wind forcing, from the Chesapeake Bay is generally restricted to a narrow band along the coast (Valle-Levinson and Lwiza, 1998). North-northeast winds enhance the buoyant plume flowing out of the Chesapeake Bay and favor seaward, cross-shore, near-bottom flow (Xu and Wright, 1998).

The mean annual significant wave height offshore Virginia Beach is approximately 1 m (Hobbs et al., 2006); winter significant wave heights average 1.2 m, whereas summer wave heights average 0.7 m. The most frequently-occurring waves propagate from the south-

southeast, but the largest waves are generally from the east-northeast (Dolan et al., 1988). Waves approaching during the fall and winter are primarily from the northeast, compared to east and southeast directions for spring and summer. Komar and Allan (2008) have recently reported a progressive increase in summer wave heights since the mid-1970s and attributed that change to intensification and increased frequency of hurricanes, which are most important to wave generation in summer months. In contrast, waves measured during the winter, generated largely by northeasters, have not experienced a statistically significant change.

Maa and Hobbs (1998) demonstrate strong wave convergence near Sandbridge Beach for all wave propagation directions because of refraction induced by the Sandbridge Shoal complex. A regional maximum in long-term shoreline erosion rates coincides with the zone of regionally high breaking-wave heights along Sandbridge Beach (Wright et al., 1987; Maa and Hobbs, 1998). Net annual sediment flux in the surf zone is northward, contrasting transport on the inner shelf (Wright et al., 1987; Kelley et al., 2001a). A nodal point, or zone of divergence in long-shore sediment transport, occurs immediately south of Sandbridge Beach (Hobbs et al., 1999). These phenomena contribute to long-term retreat rates of 3.5 m/yr at the southern end of Sandbridge, compared to 1.1 m/yr at the northern end (Hobbs et al., 1999; Kelley et al., 2001b).

6.1.5 Noise. Noise levels in the area are typical of recreational and beach activities. Noise levels fluctuate with the highest levels usually occurring during the spring and summer months due to increased tourism, boating, vessel traffic, military activity, fishing, and coastal activities. The project vicinity does not encompass any noise-sensitive institutions, structures, or facilities such as churches, parks, or hospitals. Noise from the dredge equipment and other job-related equipment would increase during the proposed operations in the project vicinity.

In recent years concerns have been raised regarding underwater noise of anthropogenic origin and potential impacts on aquatic organisms. Hypothetically, underwater sounds may interrupt or impair communication, foraging, migratory, and other behaviors of aquatic organisms. To obtain data to address this concern, field investigations were undertaken to characterize underwater sounds typical of bucket, hydraulic cutterhead, and hopper dredging operations (Dickerson, et al., 2001). Preliminary findings were that cutterhead dredging operations are relatively quiet as compared to other sound sources in aquatic environments. Hopper dredges produce somewhat more intense sounds similar to those generated by vessels of comparable size and bucket dredging sounds represent a more complex spectrum of sounds, very different than either cutterhead or hopper dredges. A trailing suction hopper dredge would most likely be utilized for this project. Hopper dredge noise consist of a combination of sounds emitted from two relatively continuous sources: engine and propeller noise similar to that of large commercial vessels, and sounds of dragheads moving in contact with the substrate. The intensity, periodicity, and spectra of emitted sounds differ greatly among dredge types. Components of underwater sounds produced by each type are influenced by a host of factors including substrate type, geomorphology of the waterway, site-specific hydrodynamic conditions, equipment maintenance status, and skill of the dredge plant operator (Dickerson, et al., 2001).

6.1.6 Hazardous Material. The VDEQ Waste Division has furnished the following inventories of generators and sites of Hazardous, Toxic, and Radioactive Wastes (HTRW) within the project area:

1) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Information System. This database lists potential hazardous release sites under the Superfund Program.
2) Resource Conservation and Recovery Information System (RCRIS). This is an inventory of hazardous waste handlers.
3) Toxics Release Inventory. This is an information system about toxic chemicals that are being used, manufactured, treated, transported, or released into the environment.
4) Solid Waste Facilities Inventory. This is an information system about large facilities for the storage and handling of solid waste, whether transported or left in place.

No CERCLA sites are located within 4 miles of the project area. One RCRIS generator at False Cape State Park is located within four miles of the project area. No generators or handlers of HTRW are located within the project area.

During an archaeological remote sensing survey conducted in 2007, it was determined the borrow area (Sandbridge Shoal) had high potential for other materials, such as ordnance, because the shoal was within an area designated as a range for coastal ordnance training and military weapons experiments (Watts, 2007). Historical records confirmed those activities associated with the operations at the Fleet Combat Training Center at Dam, located just north of Snadbridge. Since small caliber unexploded ordnance (UXO) may be encountered in the borrow areas during dredging operations, as a safety precaution, the Corps requires that a screen be placed over the drag head to effectively prevent any of the UXO from entering the hopper and/or being subsequently placed on the beach.

6.1.7 Water Quality.

6.1.7.1 Placement Site. The state waters immediately seaward of the nourishment site extending offshore towards the 3-mile limit of the borrow site are considered Class I Special Standard a Open Ocean waters (9 VAC 25-260-520). This classification pertains to waters generally used for public or municipal water supplies, primary contact recreations, fishing, or other beneficial uses (MMS, 1997). Under this classification, the requirements for minimum dissolved oxygen are 5.0 mg/l, pH range of 6.0 to 9.0, and any rise above natural temperature shall not exceed 3 degrees Celsius. The special standard sets fecal coliform standards for shellfishing waters (9 VAC 25-260-310). The City of Virginia Beach monitors waters off Sandbridge Beach for bacteria during spring and summer months; no exceedances have been documented between 2004 and 2008. Turbidity is the main water quality parameter expected to be affected by placement operations. The Nephelometric Turbidity Unit (NTU) is the legal standard for measuring turbidity, which is defined as a decrease in water clarity due to fine silt and clay particles in suspension.

6.1.7.2 Borrow Area. The borrow area at Sandbridge Shoal is located 3 nautical miles from the shoreline, outside of Virginia's territorial sea, and is considered Class I Open Ocean. Substrate at the Sandbridge Shoal is "clean sand" characterized as medium grained (mean grain size of 0.2 mm) with little silt or clay content (MMS, 1997).

6.1.8 Air Quality. Concentrations of air pollutants in the Sandbridge Beach area, except ozone, are within the national ambient air quality standards (NAAQS). The Norfolk-Virginia

Beach-Newport News-Hampton Roads area is classified marginal nonattainment with respect to the 8-hour ozone standard (April 30, 2004 Federal Register). The nonattainment designation was based on ozone data collected in the 2001-2003 monitoring period. On March 12, 2008 the EPA promulgated a more stringent standard for ozone. The new standard for the 8-hour average ozone concentration is 0.075 parts per million (ppm). The EPA is required to make a decision on classifications by March 2010. Based on the measurements collected for the years 2006 through 2008, ozone concentrations in the proposed project area exceed the revised standard (ambient air quality data for Virginia obtained from http://www.epa.gov/air/data/geosel.html). The Virginia Air Pollution Control Board general conformity regulations (9 VAC 5-160) require a Federal agency to prepare conformity determination if the total of direct and indirect emissions from a Federal action in an ozone nonattainment or maintenance area exceeds 100 tons per year of nitrogen oxides (NOx) or volatile organic compounds (VOC) (http://www.deq.virginia.gov/air/regulations/airregs.html).

Air emissions associated with the proposed action would result from operation of the dredge pumps and coupled pump-out equipment, the dredge propulsion engines, and the tugs and barges used in the placement and relocation of the mooring buoys. In addition, air emissions would result from bulldozers used on the beach in the construction of the berm and from trucks used in supporting operations.

6.2 Coastal and Aquatic Resources:

6.2.1 Benthos, Motile Invertebrates, and Fishes.

6.2.1.1 Placement Site. High-energy beaches along the U.S. Atlantic coast are dominated by two types of infaunal assemblages: small interstitial organisms and large mobile organisms. Interstitial organisms are usually more abundant while larger organisms constitute a greater proportion of the biomass. The distribution of beach infauna is dependent on several physical factors, including wave energy, tidal range, sediment texture, and morphological features of the beach, such as cusps and horns. Intertidal infauna are usually highest in both abundance and biomass in the summer, and lowest during mid-winter. Biological abundance is seasonal, with the maximum achieved in the summer and the minimum in the winter, throughout the surf zone in the southeast. Species composition varies within different areas of the beach, with less species diversity occurring in the upper beach zone. The following types of organisms are typically found along sandy beaches in their respective zones: 1) upper beach - burrowing organisms such as talitrid amphipods (sand fleas), ocypodid crabs, and isopods; and transient animals, such as scavenger beetles; 2) midlittoral zone - polychaetes, isopods, and haustoriid amphipods; and interstitial organisms that feed on bacteria and unicellular algae among the sand grains; 3) swash zone - polychaete worms, coquina clams, and mole crabs; and 4) surf zone - shellfish, forage fish, and predatory birds; offshore migrating predators are most common in this zone. (ASMFC, 2002)

6.2.1.2 Borrow Area. In the spring and fall seasons of 1996 and 1997, Virginia Institute of Marine Science (VIMS) conducted benthic and biological resource sampling off the Virginia coast including the Sandbrige Shoal area (Cutter & Diaz, 1998). Sediment types in the study region were primarily sands from -1 to 4 mesh diameter (phi), though some fine sands of 2 to 3 (phi) were also common. Muds were prevalent in the northwestern part of the study area and in patches throughout the region. Muds were typically silt to clayey silt. The spring 1997 sampling grid did not encounter as many silty sediment patches as did the 1996 sampling. A total of 119 species were identified from 13 of the grab samples, and half of the top 14 species in terms of occurrence and abundance were polychaetes (i.e. bristle worms). The other half consisted of only one representative each from the amphipods (scud, shrimp-like species), bivalves (i.e. scallops & clams), nemerteans (i.e. ribbon worms), echinoderms (i.e. sea stars), chordates (i.e. fishes), decapods (larger crustaceans such as shrimp, lobster, & crab), and tanaids (tiny crustaceans). The fall 1997 sampling revealed a similar pattern of benthic composition. In fall, annelid biomass production fell off during both sampling years, likely due to post settlement seasonal growth and mortality of macrofauna. The size distribution of the benthos, both biomass and number of individuals, is a very important limiting factor in determining potential food resources available to bottom-feeding fish and crabs and are data used in calculating secondary production. Crustacean production was low throughout the study area for all seasons, though relatively higher in the northwest sample grid and at one site in the study area off Sandbridge. Overall, the community composition within the study area was typical for sandy shallow continental shelf habitats, with annelids being the dominant taxonomic group in numbers, biomass, and trophic distribution. Generally, benthos of the Mid-Atlantic continental shelf increase in species diversity and densities with increased depth along the shelf. A larger number of species and higher densities are typically found in the depressions between small sand waves and larger ridges and swales where finer sediments with high organic content deposit. The inner shelf undergoes wide yearly fluctuations in water temperature and is affected by wave action, which creates a more rigorous and stressful environment where fewer species live than the central or outer continental shelf.

From 2002 to 2005, VIMS implemented a rigorous field program that focused on possible biological impacts from ongoing dredging of Sandbridge Shoal (Diaz et al., 2006). Results from that field campaign were compared to earlier benthic assessments (Cutter and Diaz, 1998). During survey periods in 2002, 2004, and 2005, physical processes were predominant in structuring sediment surfaces for all sampling stations in all years. Observations in 1996 and 1997 showed more biologically dominated habitats with increasing distance off shoal. Diaz et al. (2006) have attributed some of the spatial and temporal heterogeneity to 1) energetic storms which expose and rework surface sediments, 2) infrequent, but significant benthic recruitment events, and 3) seasonal variability. The benthic community composition on Sandbridge Shoal for 1996-1997 and 2002-2005 periods was similar. Cutter and Diaz (1998) found polychaetes, amphipods, decapods, bivalves, sand dollars, and lancelets (primitive animals) to be the dominant groups. Diaz et al. (2006) found the most abundant benthic group during 2002-2005 monitoring was polychaetes. Other benthic species observed included amphiods, bivalves, lancelets, and to a lesser extent, decapods, nemerteans, echinoderms, anemonies (sea anemone), isopods (crustaceans related to shrimp and crabs), gastropods, phoronids (i.e. horseshoe worms), and tunicates (primitive animals). Diaz et al. (2006) and Cutter and Diaz (1998) observed that macrobenthic production was higher off shoal relative to on shoal. The average macrofaunal abundance in 1996 and 1997 was 1½ to 2½ times lower than 2002 to 2005 conditions.

In providing support data to the (Supplement) Final Environmental Impact Statement-Virginia Beach Erosion Control and Hurricane Protection Project, the U.S. Fish and Wildlife Service conducted a benthic sampling program for nearshore habitat of Virginia Beach (USACE, 1994). In total, 40 benthic samples were taken at eight stations. The most abundant forms (in descending order) were polychaete worms, bivalve mollusks and amphipod crustaceans. Densities of macrobenthic organisms generally ranged between 3,400 and 7,400 individuals per square meter. In a few stations, the polychates (*Cirratulidae spp.*) were particularly abundant, and densities were even greater, with a peak value of 19,800. Three trawl stations occupied during the course of this study showed the dominant epibenthos were blue mussel (*Mytilus edulis*), common squid (*Loligo pealei*), hermit crab (*Paragus longicarpus*), windowpane flounder (*Scopthalmus aquosus*) and spotted hake (*Urophycis regia*). The blue crab (*Callinectes sapidus*) was poorly represented in the trawl data.

Some common invertebrates found in Mid-Atlantic waters are brown shrimp (*Panaeus aztecus*), pink shrimp (*P. duorarum*), white shrimp (*P. setiferus*), horseshoe crab (*Limulus polyphemus*), sea nettle (*Chrysaora quinquecirrha*), and sea star (*Asterias forbesi*). Common vertebrate species include Atlantic bottlenose dolphins (*Tursiops truncates*), sandbar sharks (*Carcharhinus plumbeus*), Atlantic sharpnose sharks (*Rhizoprionodon terraenovae*), and common fish species include the bluefish (*Pomatomus saltatrix*), windowpane flounder (*Scopthalmus aquosus*), summer flounder (*Paralicthys dentatus*), scup (*Stenotomus chrysops*), Atlantic sea herring (*Clupea harengus*), black sea bass (*Centropristus striata*), king mackerel (*Scomberomorus cavalla*), Spanish mackerel (*Scomberomorus maculatus*), cobia (*Rachycentron canadum*), red drum (*Sciaenops occelatus*), red hake (*Urophycis chuss*), yellowfin tuna (*Thunnus albacares*) sea robins (*Prionotus carolinus*), butterfish (*Peprilus triacanthus*), and pinfish (*Lagodon rhomboids*).

During the 2002-2005 monitoring, 1,600 fishes and skates, representing 12 taxa, and 1,000 invertebrates, representing 12 taxa, were collected on Sandbridge Shoal. The most common fishes were sea robins, accounting for 32% of all fishes. Spotted hake was the second most abundant and accounted for 26% of the fishes, even though it did not occur in any trawl in 2002. Butterfish were 16% of the fishes, even though it did not occur in 2002. Pinfish and smallmouth flounder were 16% and 6% of the fishes, respectively. The trawls also collected hermit crabs (*Pagurus* spp.), sand shrimp (*Crangon septemspinosa*), Atlantic brief squid (*Lolliguncula brevis*), and Atlantic bobtail squid (*Rossia* sp.). For the most abundant fishes, there were no differences in habitat utilization, but fishes generally showed broad preference for sandy habitat. The food web in the vicinity of Sandbridge Shoal was generally limited to two trophic levels beyond the primary producers; primary consumers, such as bivalves and amphipods, supported secondary consumers and demersal fish at the third trophic level. Top level species were spotted hake and weakfish.

6.2.2 Submerged Aquatic Vegetation. No submerged aquatic vegetation is present within or near any of the potential borrow areas or offshore of the proposed nourishment area. The proposed borrow areas are too deep and not within the photic zone. No submerged aquatic vegetation subsists in the beach sands of the proposed nourishment area due to the high energy of the waves and the extremes of temperature, availability of water, and fluctuations in salinity.

6.2.3 Essential Fish Habitat. Essential Fish Habitat (EFH) is defined in the Magnuson-Stevens Fishery Conservation and Management Act as…"those waters and substrates necessary to fish for spawning, breeding, feeding or growth to maturity." The designation and conservation of EFH seeks to minimize adverse effects on habitat caused by fishing and non-fishing activities. The 1996 amendments to the Magnuson-Stevens Fishery Management and

Conservation Act require Federal agencies to consult with the National Marine Fisheries Service (NMFS) regarding the potential effects of their actions on EFH. The project area includes the waters of Sandbridge Shoal and ocean shore of Sandbridge Beach.

Under provisions of the reauthorized Magnuson-Stevens Fishery Conservation and Management Act of 1996, the following species were designated as having a Fishery Management Plan: windowpane flounder (*Scopthalmus aquosus*), bluefish (*Pomatomus saltatrix*), Atlantic butterfish (*Peprilus triacanthus*), summer flounder (*Paralicthys dentatus*), witch flounder (*Glyptocephalus cynoglossus*), scup (*Stenotomus chrysops*), Atlantic sea herring (*Clupea harengus*), surfclam (*Spisula solidissima*), black sea bass (*Centropristis striata*), monkfish (*Lophius americanus*), spiny dogfish (*Squalus acanthias*), king mackerel (*Scomberomorus cavalla*), Spanish mackerel (*Scomberomorus maculatus*), cobia (*Rachycentron canadum*), red drum (*Sciaenops occelatus*), red hake (*Urophycis chuss*), sand tiger shark (*Charcharias taurus*), Atlantic sharpnose shark (*Rhizoprinodon terraenovae*), dusky shark (*Charcharinus obscurus*), sandbar shark (*Charcharinus plumbeus*), scalloped hammerhead shark (*Spyrna lewini*), tiger shark (*Galeocerdo cuvieri*), clearnose skate (*Raja eglanteria*), little skate (*Raja erinacea*), and winter skate (*Raja ocellata*) (NMFS, 2006). Those bottom habitats with mud, gravel, and sand substrate that occur within the project area are designated as EFH for the clearnose skate. Those bottom habitats with soft bottom, rocky, or gravelly substrates that occur within the project area are designated as EFH for the little skate. For the winter skate, those bottom habitats with a substrate of sand and gravel or mud that occur within the project area are designated as EFH. The NMFS designated a "habitat area of particular concern" (HAPC) for the sandbar shark but not for any other Atlantic highly migratory species (HMS) due to a general lack of scientific information detailing HMS-habitat associations. There are no management or fisheries restrictions in place in or around the project area at this time. A detailed discussion and assessment of impacts to EFH for the above species are included in Appendix B of this document.

6.2.4 Threatened and Endangered Species. Preliminary review of this action identified species on the Department of Commerce, National Marine Fisheries Service (NMFS) and the Department of the Interior, U.S. Fish and Wildlife Service (USFWS) List of Threatened and Endangered Wildlife and Plants in Virginia. The following list identifies the Federally listed species that may occur along the Atlantic Coast of southern Virginia:

E - Listed Endangered   T- Listed Threatened
(Last Updated: October 7, 2008 - U.S. Fish and Wildlife Service, Virginia Field Office)

Whales
E- Blue whale (*Balaenoptera musculus)*
E- Finback whale (*Balaenoptera physalus)*
E- Humpback whale (*Megaptera novaengliae)*
E- Right whale (*Eubalaena glacialis)*
E- Sei whale (*Balaenoptera boreal*is)
E- Sperm whale (*Physeter macrocephalus)*

Birds
T- Piping plover (*Charadrius melodus)*

E- Roseate tern (*Sterna dougallii dougallii)*

Fish
E- Shortnose sturgeon (*Acipenser brevirostrum)*

Turtles
T- Loggerhead sea turtle (*Caretta caretta)*
T- Green sea turtle (*Chelonia mydas)*
E- Leatherback sea turtle (*Dermochelys coriacea)*
E- Hawksbill sea turtle (*Eretmochelys imbricate*)
E- Kemp's ridley sea turtle (*Lepidochelys kempii)*

Plants
T- Seabeach amaranth (*Amaranthus pumilus)*

Insects
T- Northeastern beach tiger beetle (*Cicindela dorsalis dorsalis*)

Of the listed species, only the sea turtles, piping plover, roseate tern, right whale, humpback whale, and finback whale may be potentially affected by this action. The blue whale, sei whale, sperm whale, seabeach amaranth, and northeastern beach tiger beetle are highly unlikely to occur within the project area. A review of the listed shortnose sturgeon indicated a low likelihood of occurrence within the project area; however, since its habitat range (historically) is within a proximate distance, continued consideration by this document was warranted.

Blue whales are rare in the shelf waters of the eastern United States. Occasional sightings of individuals have been made off Cape Cod, Massachusetts, in summer and fall. Farther north in Canadian waters, a few sightings have been made on the Scotian Shelf, and two blue whales were sighted in August 1995 in the lower Bay of Fundy. A stranding at Ocean City, Maryland, in October 1891 is the southernmost confirmed record on the east coast (NMFS, 1998).

Sei whales prefer subtropical to subpolar waters on the continental shelf edge and slope worldwide; they are usually observed in deeper waters of oceanic areas far from the coastline (Waring, 2007). The entire distribution and movement patterns of this species is not well known. They are believed to undertake seasonal north/south migrations; spending the summer on feeding grounds in the higher latitudes and winter in lower latitudes where they most likely breed or calve.

Sperm whales tend to inhabit areas with a water depth of 1,968 feet (600 m) or more, and are uncommon in waters less than 984 feet (300 m) deep. Female sperm whales are generally found in deep waters (at least 3280 feet, or 1000 m) of low latitudes (less than 40°, except in the North Pacific where they are found as high as 50°). These conditions generally correspond to sea surface temperatures greater than 15°C, and while female sperm whales are sometimes seen near oceanic islands, they are typically far from land (NMFS, 2006).

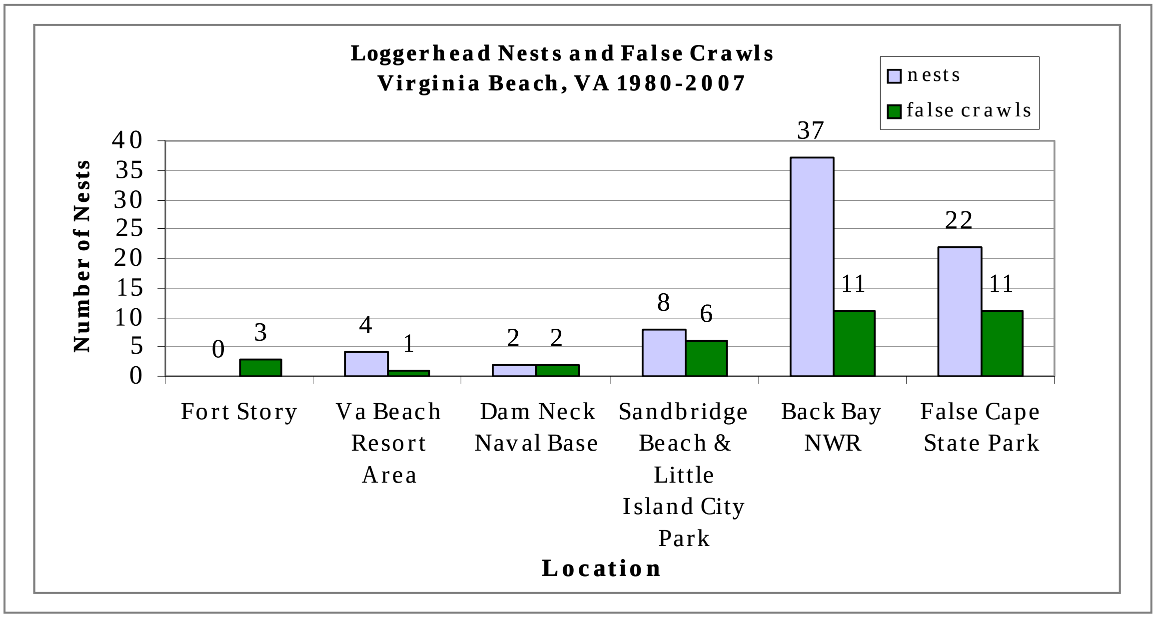
At one time, seabeach amaranth thrived in coastal environments from Massachusetts to South Carolina. A review of the species indicated it has been reduced to about one-third of historical distribution, found only on a few protected undeveloped beaches. It is thought to no longer occur, or very rarely to occur, on beaches in Massachusetts, Rhode Island, New Jersey, Delaware, most of Maryland, and Virginia. Therefore, seabeach amaranth was not assessed further by this document.

Historically, the northeastern beach tiger beetle was common on coastal beaches from Massachusetts to central New Jersey, and along the Chesapeake Bay in Maryland and Virginia. Currently, the only populations known to exist along the Atlantic Coast are in New Jersey and southeastern Massachusetts; the majority of populations occur along the Chesapeake Bay in Maryland and Virginia (USFWS, 1999). Virginia populations are distributed along the eastern and western shorelines of Chesapeake Bay (more than 60 miles from Sandbridge Beach).

Loggerhead sea turtle (*Caretta caretta).* Loggerhead sea turtles occur throughout the temperate and tropical regions of the Atlantic, Gulf of Mexico, Pacific, and Indian Oceans. This species may be found hundreds of miles out to sea, as well as in inshore areas such as bays, lagoons, salt marshes, creeks, and the mouths of large rivers. As loggerheads mature, they travel and forage through near shore waters until their breeding season, when they return to the nesting beach areas. This species nests within the U.S. from Texas to Virginia, although the major nesting concentrations are found along the Atlantic coast of Florida, Georgia, South Carolina, and North Carolina. The loggerhead sea turtle nests in small numbers along Virginia's coast and is the only predominant species recurrently nesting along the Virginia Beach coastline (Dodd, 1998). The northern extent of its nesting range in the United States is along the Virginia/Maryland border. Loggerhead females generally nest every 2 to 4 years, and lay from 1 to 6 clutches of eggs a season. The re-nesting interval varies from 12 to 16 days, with an average of 14 days (NMFS, 1991). Sea turtles return to the same area to lay successive clutches of eggs that are usually within a 5 km radius of the first nest. Thus, the discovery of one nest may mean that others will soon follow. It is unlikely that loggerheads will be spotted until the ocean temperature reaches 74º F; they are usually found in Virginia's waters from May through November. Because of the movement of individual loggerhead sea turtles, it is difficult to estimate the population of this species in U.S. and territorial waters, although numbers of nesting females give a useful index of the species' population size and stability at this life state. Unfortunately, population trends analysis based upon this method may not reflect overall population growth rates, since a female may lay multiple nests in any one season.

Occasionally, a nesting turtle may emerge from the ocean but not lay eggs on the beach. This event, characterized by an abandoned nesting attempt or simply a U-shaped crawl from the ocean up the beach, then back to the water, is called a false crawl. A turtle may false crawl for a number of reasons, some of which include; being disturbed by lights or noise; encountering obstacles; encountering roots, debris, or rocks while digging her egg chamber; and sand not having the right consistency or moisture. A turtle may false crawl at any point in her nesting sequence up to the point where her eggs are laid. A turtle may even complete her egg chamber and for some reason not deposit her eggs. The key factor that indicates whether a turtle has laid her eggs or not is the presence or absence of a mound of sand and the escarpment created when the turtle flings the sand back over her nest site. A turtle will not obliterate her nest site if she has not deposited eggs (VIMS, 2008).

Since 1980, the USFWS, volunteers and staff at Back Bay National Wildlife Refuge have surveyed the Virginia Beach coastline throughout sea turtle nesting season; map of the areas patrolled daily is shown on Figure 5. The chart below represents nests and false crawls located at the sections of beach surveyed.



A total of 73 nests were recorded in Virginia Beach over the 27-year summary period. The overall hatch success rate was 76% (does not include 3 nests lost to Hurricane Isabel). Sandbridge Beaches accounted for 11% of the nesting sites, Virginia Beach Resort (and Croatan) beaches 5% of the nesting sites, Dam Neck Naval Base 3% of the nesting sites, and none were recorded at Fort Story. The majority (81%) of the nesting sites occurred at Back Bay and at False Cape State Park, the longest contiguous tract of undeveloped shoreline in the city. For various reasons, including water temperature, this area has been chosen by the loggerheads as the most suitable nesting site. Another of the likely reasons is the learned behavior of the turtles relocated to Back Bay from more northern nesting sites by USFWS Back Bay National Wildlife Refuge staff as part of the Loggerhead Egg Transplant Project. Back Bay and False Cape State Park have become the familiar land-based sites for these turtles to return to as adults.

Green sea turtle (*Chelonia mydas).* The green turtle was listed under the Endangered Species Act (ESA) on July 28, 1978. The breeding populations in Florida and the Pacific coast of Mexico are listed as endangered; elsewhere the species is listed as threatened. Green sea turtles are found worldwide, although this species is concentrated primarily between the 35° North and 35° South latitudes. In U.S. Atlantic and Gulf of Mexico waters, green turtles are found in inshore and nearshore waters from Texas to Massachusetts, the U.S. Virgin Islands, and Puerto Rico (NMFS, 1991). Green sea turtles tend to occur in waters that remain warmer than 68° F. Adult green turtles are unique among sea turtles in that they are herbivorous, feeding primarily on seagrasses and algae. This diet is thought to give them greenish colored fat, from which they take their name. A green turtle's carapace (top shell) is smooth and can be shades of black, gray, green, brown, and yellow. Their plastron (bottom shell) is yellowish white. This species migrates often over long distances between feeding and nesting areas. Mid-Atlantic Green turtle population estimates are derived from the major nesting beaches for this species along the

Atlantic coast of Florida with some usage of the beaches of the panhandle. Until the nesting season of 2005, there had been no documented nest sites for this species north of North Carolina. The first documented green turtle nest site north of North Carolina was discovered on August 1, 2005, by a passer-by on the beach south of Sandbridge, several miles south from the project site. Biologists at Back Bay National Wildlife Refuge confirmed that 124 eggs were successfully laid by a green turtle as observers monitored the egg laying. The eggs were immediately transplanted to a secured site on the refuge (Glass, 2005).

Leatherback sea turtle (*Dermochelys coriacea).* The leatherback is the largest turtle and the largest living reptile in the world. Mature males and females can be as long as six and a half feet (2 m) and weigh almost 2,000 lbs. (900 kg). The leatherback is the only sea turtle that lacks a hard, bony shell. A leatherback's carapace is approximately 1.5 inches (4 cm) thick and consists of leathery, oil saturated connective tissue overlying loosely interlocking dermal bones (NMFS, 1992). Leatherbacks are the most migratory and wide ranging of sea turtle species. In the Atlantic, their range extends from Cape Sable, Nova Scotia, south to Puerto Rico and the U.S. Virgin Islands. Leatherbacks are found in temperate waters while migrating to tropical waters to nest. Distribution of this species has been linked to thermal preference and seasonal fluctuations in the Gulf Stream and other warm water features (Fritts, 1983). Nesting of Leatherback sea turtles is nocturnal with only a small number of nests occurring in the United States in the Gulf of Mexico (Florida) from April to late July. Leatherbacks prefer open access beaches possibly to avoid damage to their soft plastron and flippers. Unfortunately, such open beaches with little shoreline protection are vulnerable to beach erosion triggered by seasonal changes in wind and wave direction. Thus, eggs may be lost when open beaches undergo severe and dramatic erosion. The Pacific coast of Mexico supports the world’s largest known concentration of nesting Leatherbacks. There is very little nesting in the United States. Nest counts are the only reliable source of population data for leatherback turtles. The adults of the species are found in low numbers in the lower Chesapeake Bay during summer. Leatherbacks do not nest on any Virginia coast beaches.

Hawksbill sea turtle (*Eretmochelys imbricate).* Hawksbill turtle population estimates are derived from beach nest sites in the Virgin Islands and Puerto Rico. The hawksbill turtle's status in the United States has not changed since it was listed as endangered in 1970. It is small to medium-sized compared to other sea turtle species. Adults weigh 100-150 lbs (45 to 68 kg) on average, but can grow as large as 200 lbs (NMFS, 1993). It is a solitary nester, so population trends or estimates are difficult to determine. The most significant nesting within the U.S. occurs in Puerto Rico and the U.S. Virgin Islands, specifically on Mona Island and Buck Island, respectively. Each year, about 500-1000 hawksbill nests are laid on Mona Island, Puerto Rico, and another 100-150 nests on Buck Island Reef National Monument off St. Croix in the U.S. Virgin Islands. Within the continental U.S., nesting is restricted to the southeast coast of Florida and the Florida Keys, but nesting is rare in these areas. In addition to nesting beaches in the U.S. Caribbean, hawksbills nest at numerous other sites throughout the Caribbean, with the majority of nesting occurring in Mexico and Cuba. The largest nesting population of hawksbills appears to occur in Australia. Approximately 2,000 hawksbills nest on the northwest coast of Australia and about 6,000 to 8,000 off the Great Barrier Reef each year. Although the species is an occasional visitor to the Mid-Atlantic region, hawksbill sightings are very rare on Virginia beaches (Williams et al, 2000). The NMFS contractor observer program (50 CFR' 229.7(c)) has not recorded any takes in northeast or Mid-Atlantic fisheries.

Kemp's ridley sea turtle (*Lepidochelys kempii).* Adult Kemp's ridleys, considered the smallest marine turtle in the world, weigh on average around 100 pounds (45 kg) with a carapace (top shell) measuring between 24-28 inches (60-70 cm) in length. They are the most endangered of all sea turtles, listed in the United States as endangered throughout its range in 1970. Kemp's ridley sea turtle population estimates are derived from the only major nesting site for the species, a single stretch of beach near Rancho Nuevo, Tamaulipas, Mexico. The number of nests observed here is increasing at a mean rate of 11.3 percent per year since 1966, allowing some optimism about the possible recovery of the most endangered sea turtle species. Similar to olive ridleys, Kemp's ridleys display one of the most unique synchronized nesting habits in the natural world. Large groups of Kemp's ridleys gather off a particular nesting beach near Rancho Nuevo, Mexico, in the state of Tamaulipas. Wave upon wave of females come ashore and nest in what is known as an "arribada," which means "arrival" in Spanish (NMFS, 1992). There are many theories on what triggers an arribada, including offshore winds, lunar cycles, and the release of pheromones by females. Scientists have yet to conclusively determine the cues for ridley arribadas. Arribada nesting is a behavior found only in the genus Lepidochelys. Female Kemp's ridleys nest from May to July, laying two to three clutches of approximately 100 eggs, which incubate for 50-60 days.

Piping plover (*Charadrius melodus).* The piping plover breeds on coastal beaches from Newfoundland and southeastern Quebec to North Carolina. Piping plovers favor open sand, gravel, or cobble beaches for breeding. Breeding sites are generally found on islands, lake shores, coastal shorelines, and river margins. These birds winter primarily on the Atlantic Coast from North Carolina to Florida, although some migrate to the Bahamas and West Indies (USFWS, 2007). The piping plover is an uncommon summer resident in the lower Chesapeake Bay. It breeds and forages in Virginia from March to October. All piping plovers are considered threatened species under the Endangered Species Act when on their wintering grounds. Critical habitat identifies specific areas that are essential to the conservation of a listed species, and that may require special management considerations or protection.

Roseate tern (*Sterna dougallii dougallii).* Currently about 6,000-6,500 roseate terns breed in an area from the south shore of Long Island, New York, north to Nova Scotia, Canada (Spendelow, 1995). Although its range in North America is often listed as extending from Nova Scotia to Virginia or North Carolina and the southern tip of Florida, the roseate tern is most common from Massachusetts to Long Island; they no longer breed south of Long Island, NY (USFWS, 1998). Almost all important colonies of roseate terns are and have been on small islands, often located at ends or breaks in barrier islands. Nesting habitat for the northeastern North American population has been greatly reduced by housing developments and other human activity on and near the coastal barrier islands. Some roseate terns have attempted to nest with common terns in the salt marshes but with almost no success. The decline of the northeastern population of roseate terns and its subsequent listing as endangered prompted an intensive study into the causes of its endangerment and possible strategies for its recovery. The two main factors identified as limiting to roseate terns in the Northeast were loss of nesting sites and predation. Many islands that traditionally were used as nesting sites by roseate terns have been taken over by herring gulls (*Larus argentatus*) and great black-backed gulls (*L. marinus*); other islands were lost to erosion. The loss of these islands to gulls or erosion forced roseate terns to nest at sites either on or close to the mainland, where they are more vulnerable to human disturbance and to predators. Historically, they nested on the Eastern Shore, but no known nests have been documented since 1927. The northeast population of the roseate tern nests on barrier islands and salt marshes, typically along with common terns, and forages over shallow coastal waters, inlets, and offshore seas. While competing with common terns for food and nesting sites, roseates benefit from the former's aggressive defense of colony sites against predators. While breeding, they primarily feed on American sand lance, a small marine fish. Their nesting success rates may be related to the abundance and proximity of sand lance.

Finback whale (*Balaenoptera physalus).* Fin whales are found in all the world's major oceans, from polar to tropical waters. It is the second largest whale and the second largest living animal after the blue whale (American Cetacean Society, 2004). Adult males measure up to 78 feet (24 m) in the northern hemisphere, and 88 feet (26.8 m) in the southern hemisphere. Females are slightly larger than males. Weight for both sexes is between 50-70 tons (45,360-63,500 kg). The highest population density occurs in temperate and cool waters. It is less densely populated in the hottest, equatorial regions; it prefers deep waters beyond the continental shelf. Fin whales are common in waters of the U. S. Atlantic Exclusive Economic Zone (EEZ), principally from Cape Hatteras northward but are mostly northern, with few sightings south of Cape Cod. Fin whales are migratory, moving seasonally in and out of high-latitude feeding areas; however, the overall migration patterns are complex and not well understood (NMFS, 2006). They feed mainly on small shrimp-like creatures called krill and schooling fish. In autumn, these whales migrate several thousand miles to equatorial waters to mate during the winter. They were hunted extensively between the 1930's and the 1960's, but now since they are protected worldwide, fin whales are estimated to number 40,000 - 60,000. Currently, the largest threat to fin whales is entanglement and habitat destruction.

Humpback whale (*Megaptera novaengliae).* The humpback whale is found in all the major oceans in a wide band running from the Antarctic ice edge to 65° N latitude. They are distinguished from other whales in the same Family (Balaenopteridae) by extraordinarily long flippers, a more robust body, fewer throat grooves, more variable dorsal fin, and utilization of very long (up to 30 min.) and complex, repetitive vocalization (songs) during courtship (NMFS, 1991). Like other whales, the humpback whale became endangered as a result of exploitation from commercial whaling (Marine Mammal Commission, 2002). The species first received protection in the North Atlantic in 1955 when the International Whaling Commission placed a prohibition on non-subsistence hunting by member nations. Protection was extended to the North Pacific and Southern Hemisphere populations after the 1965 hunting season. It was classified as an endangered species when the ESA was passed in 1973, and it remains so today. Currently, there are is estimated 30,000–40,000 humpback whales worldwide. An increased number of sightings of humpback whales in the vicinity of the Chesapeake and Delaware Bays occurred in 1992. A reported 38 humpback whale strandings occurred during 1985-1992 in the U.S. mid-Atlantic and southeastern states. The strandings increased, particularly along the Virginia and North Carolina coasts, and most stranded animals were sexually immature; in addition, the small size of many of these whales strongly suggested that they had only recently separated from their mothers (NMFS, 2007).

Right whale (*Eubalaena glacialis).* Right whales are the rarest of all large whale species and are among the rarest of all marine mammal species. The North Atlantic right whale primarily occurs in coastal or shelf waters. Individuals in the western North Atlantic population range from winter calving and nursery areas in coastal waters off the southeastern United States to summer feeding grounds in New England waters and north to the Bay of Fundy and Scotian Shelf (NMFS, 2005). In spring, summer and autumn, they feed in areas in a range stretching from New York to Nova Scotia. In winter, they head south towards Georgia and Florida to give birth. Right whales were named because when whaling started they were considered the "right" whale to hunt because they are very slow and easy to approach. NMFS designated three areas in June 1994 as critical habitat for the western North Atlantic population including coastal Florida and Georgia (Sebastian Inlet, FL to the Altamaha River, GA), Great South Channel (east of Cape Cod), and Massachusetts Bay and Cape Cod Bay. The population is currently believed to contain only about 300 individuals and it remains unclear whether its abundance is static, undergoing modest growth or, as recent modeling exercises suggest, currently in decline. However, there has been no apparent sign of recovery in the last 15 years, and the species may be rarer and more endangered than previously thought (NMFS, 2005).

Shortnose sturgeon (*Acipenser brevirostrum).* The shortnose sturgeon is anadromous, which means that it lives in slow moving river waters or nearshore marine waters, but migrates periodically to fresher water to spawn. Spawning begins in freshwater from late winter/early spring (southern rivers) to mid to late-spring (northern rivers) when water temperatures increase to 8-9°C (46-48°F). Historically, shortnose sturgeon were found in large coastal rivers of eastern North America in the Mid-Atlantic region, and in the rivers of North Carolina and Chesapeake Bay system. Shortnose sturgeon inhabit the main stems of their natal rivers, migrating between freshwater and mesohaline river reaches. Spawning occurs in upper, freshwater areas, while feeding and overwintering activities may occur in both fresh and saline habitats (NMFS, 1998). Shortnose sturgeon prefer lower salinity than pure seawater, typically in the range of 30-31 ppt (ppt-parts per thousand). In areas where the shortnose sturgeon occurs with the Atlantic sturgeon, the two species apparently segregate the habitat according to salinity preferences, with Atlantic sturgeon preferring more saline areas. Gilbert (1990) suggested that though the shortnose sturgeon is capable of entering the open ocean, it is hesitant to do so. This factor may be the single largest consideration limiting extensive coastal migrations of this species (Hill, 2008).

Anthropogenic mortality sources for the shortnose sturgeon include entrainment in dredges, entanglement in commercial or recreational fishing gear, structures associated with dams, and power plant cooling water intakes. Sources also include waterfront construction in freshwater sections of large and deep rivers where the species spawn; these include the Chesapeake Bay and its tributaries, particularly the Susquehanna, Bohemia, Potomac, and Elk Rivers. A comprehensive analysis of entanglement patterns is not available due in part to frequent confusion with the similar Atlantic sturgeon. The distribution and movement of the species in the bay is poorly understood for the same reason. When not spawning, shortnose sturgeons favor the deep channel sections of the large rivers mentioned above. Annual egg production fluctuates in the species due to several factors; females do not spawn every year. Eggs may not be fertilized due to interrupted migrations or unsuitable environmental conditions at the time of spawning.

6.3 Socio and Economic Environment:

6.3.1 Socioeconomic Resources.

6.3.1.1 Population. Virginia Beach is part of the Norfolk-Virginia Beach-Newport News Metropolitan Statistical Area (MSA), a group of economically and socially integrated cities and counties in southeastern Virginia. This city is the largest one in the state with a 2000 population of 425,257, an 8.2 percent increase from 1990 (U.S. Census). This rate of growth is a significant decrease from the 50 percent growth that occurred in the city between 1980 and 1990. While Virginia Beach's earlier growth was fueled primarily by in-migration, the growth in the last decade has been the result of natural increase (more births than deaths). The most recent state figures show an estimated 2007 population of 433,033, a 1.8 percent increase since 2000 (Weldon Cooper Center for Public Service, 2008). Projections from the Hampton Roads Planning District Commission show Virginia Beach's population continuing to grow slowly through the year 2034, reaching a figure of 469,200. This figure represents an average annual growth rate of 0.3 percent.

6.3.1.2 Employment / Economy. From 1970 to 1990, employment in Virginia Beach grew at a 7.0 percent rate as the population grew rapidly. As of the year 2000, there were 236,744 people working in the city, which is about 25 percent of the region's total employment (Bureau of Economic Analysis, 2006). Between 1990 and 2000 employment grew at an average annual rate of 2.4 percent compared to 1.1 percent for the MSA and 1.7 percent for the state. Projections by the Hampton Roads Planning District Commission show Virginia Beach's employment increasing at an average annual rate of 0.5 percent through 2034. Virginia Beach's economy is highly dependent on the Federal Government, which is the largest single employer in the city as well as in the region. For Virginia Beach most of this employment is concentrated in the four Federal military bases located in the city: Little Creek Amphibious Base, Dam Neck, Oceana Naval Air Station, and Fort Story. As of 2000, there were 23,538 military jobs in the city, which is 10 percent of Virginia Beach's total employment (BEA). Thirty-three percent of the jobs are in the services sector, followed by the trade and government sectors with 22.3 percent and 20.7 percent, respectively (BEA).

6.3.1.3 Tourism / Fishing Industry. Over the course of the year, in 2007, 2.75 million overnight visitors arrived in Virginia Beach spending approximately $857 million for accommodations, meals & entertainment. The tourism industry has created more than 14,900 jobs in the city, and visitor expenditures have generated $73.2 million in direct city revenue (City of Virginia Beach, 2008). Many visitors to Sandbridge enjoy Back Bay National Wildlife Refuge and False Cape State Park for kayaking, biking and fishing. There are hundreds of cottage and condominium rentals available year-round. The sport fishing industry and charter fishing boat trips are also a major draw for tourists and visiting anglers to the area. The resort area of Virginia Beach offers several charter fishing boats, however there are no trips that depart from Sandbridge. The Sandbridge Fishing Pier, located at Little Island State Park, is one of coastal Virginia's most popular fishing piers. Species that are commonly caught from the pier include spot, croaker, pompano, flounder, whiting, bluefish, speckled trout, blacktip reef sharks, skate and stingrays. Surf fishing from the beach is also popular. Many homes in Sandbridge are located on canals that lead out to Back Bay where boat docks are available for fishing and crabbing. Fish caught by recreational anglers in the vicinity of Sandbridge Shoal include tautog, black sea bass, cobia, king mackerel, Spanish mackerel, bluefish, striped bass, spotted trout, and pigfish (MMS, 2001). Major commercial species found in the vicinity of the shoal include menhaden, summer flounder, croaker, striped bass, blueback herring, American shad, and scup.

6.3.2 Environmental Justice. The Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations* (February 11, 1994) requires that "Federal agencies conduct their programs, policies, and activities that substantially affect human health or the environment in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons (including populations) from participation in, denying persons (including populations) the benefits of, or subjecting persons (including populations) to discrimination under such programs, policies, and activities because of their race, color, or national origin." An analysis of the U.S. Census data for 2000 shows that the census tract that encompasses the study area (tract 454.12), has a much smaller minority population than the city as a whole (see Figure 6). The non-white population for the tract was only 2.7 percent of its population, whereas the non-white population of Virginia Beach was 28.6 percent. Thus, the study area does not have a significant minority population that could be affected by project implementation. Income levels for the study area show that income levels for residents of the area are considerably higher than those for the city's residents as a whole. For example, only 34.0 percent of the households in the study area had incomes below $50,000, while 51.6 percent of the city's households had incomes below that level as of the year 2000 (U.S. Census, 2000). Only 2.9 percent of the study area individuals and no families in the study area reported incomes below the poverty level, compared to 6.5 percent and 5.1 percent for the city as a whole, respectively. These figures indicate that the study area is one of the higher income areas of the city.

6.3.3 Military Use / Navigation. Navy Fleet Combat Training Center (at Dam Neck) Firing Area (204.52) encompasses the Sandbridge Shoal borrow area. In the past, firing exercises have been conducted intermittently throughout the year. These are publicized weekly in the Coast Guard's Local Notice to Mariners, along with the presence of dredging operations. As per 33 CFR 334.380, vessels within the firing zone area shall proceed through the area with caution and shall remain therein no longer than necessary for purpose of transit. The dredging equipment and the pump-out buoys would be not operating within a navigational channel or within the firing area.

6.3.4 Cultural Resources. Although there were a few visits from Spanish explorers in the 16th century, Virginia Beach's recorded history generally began in 1607 with the landing at Cape Henry of the English settlers who eventually established the first permanent colony at Jamestown. Although the first colonists settled inland away from the coast, by 1635 settlers had started to move into the Hampton Roads area, settling along the Elizabeth, Lynnhaven, and North Landing Rivers and the north-south ridges of arable land. Several villages developed in the next 250 years in Princess Anne County, the county which would eventually make up the majority of modern day Virginia Beach.

The original town of Virginia Beach began as a small settlement near the Seatack Life Station. Towards the end of the century the town began to grow quickly as hotels and vacation cottages were constructed. By 1906, Virginia Beach had become an incorporated town, and in

1923 it annexed a small part of the county. In 1963, Princess Anne County and the city of Virginia Beach merged to become the city of Virginia Beach with its current boundaries.

Within the study area, there are no known archaeological or historical sites eligible for or listed on the National Register of Historic Places. However, the Little Island Coast Guard Station, a structure of local interest, is located landward of the beach near the Little Island City Park, a city maintained beach facility. The original U.S. Life-Saving Station (Little Island Coast Guard Station 2001-2) was constructed on this site in 1878 to protect the shoreline between the stations at Dam Neck Mills and False Cape. In 1925, the current main building and boathouse were constructed as replacements for the earlier structures. The earlier life-saving buildings were destroyed in a hurricane in 1933, during which the current building served as a shelter. The site remained an active Coast Guard station until it was deactivated in 1964. Today the site serves the City of Virginia Beach's Department of Parks and Recreation at Little Island City Park (see photos below).

In the past 15 years various remote sensing surveys of the proposed borrow areas have been carried out to determine the presence of cultural resources in these and adjacent areas. In 1996, Christopher Goodwin and Associates carried out a literature search and remote sensing survey of portions of Areas A and B for the Navy's beach nourishment project at Dam Neck, resulting in a recommendation of no further work for the six anomalies discovered in that survey. In 1998, Tidewater Atlantic Research (TAR) carried out a remote sensing survey of part of Area B, which resulted in the report, " Phase I Remote Sensing Archaeological Survey of the Sandbridge Shoal Borrow Areas Near Virginia Beach, Virginia," recommending no additional investigation.

In 2006, TAR carried out a remote sensing survey of Area A and the part of Area B that was not previously surveyed. This survey, entitled "Archaeological Remote Sensing Survey of Offshore Borrow Areas Near Sandbridge Beach, Virginia," (2007) resulted in the identification of numerous magnetic anomalies. The remote sensing survey recorded 51 unidentified magnetic anomalies and one side-scan sonar target in proposed Borrow Area A, and 37 unidentified magnetic anomalies and one side-scan sonar target within proposed Borrow Area B (Figure 3). The side-scan sonar target recorded in Borrow Area A has been identified as a small barge. Five of the magnetic anomalies were associated with this feature. The side-scan sonar target and five associated magnetic anomalies recorded in Borrow Area B have been tentatively identified as a potentially significant historic shipwreck site. Of the remaining 46 unidentified magnetic anomalies in Area A, 29 are considered to be potentially representative of historic shipwreck sites, and of the remaining 32 unidentified magnetic anomalies in Area B, 17 are considered to be potentially representative of historic shipwreck sites. Analysis of the subbottom profiler data by Tidewater Atlantic Research indicated the presence of a paleochannel feature in the extreme southeastern corner of Borrow Area A. There is a low potential for the preservation of prehistoric resources associated with the paleochannel.

6.3.5 Aesthetics. Visual and aesthetic features include a wide beach with a dune system along much of the project length and beach cottages. Most of Sandbridge is residential and privately owned; however, a small percentage of the shoreline is held in public domain where there are several public beaches. Overall, the entire length of the project can be considered aesthetically pleasing to those who enjoy the view of a residential seashore. During the summer months, tourists arrive for ocean and bayfront activities such as swimming, surfing, dining and entertainment. The Back Bay Wildlife Refuge, located (directly) south of the project, contains approximately 4,600 acres of beach, dunes, marsh and woodlands making the area a popular destination for recreation.

6.4 Regulatory Requirements:

6.4.1 Coastal Barrier Resources Act. Coastal Barrier Resources Act (CBRA) was enacted October 18, 1982 by Public Law 97-348 (96 Stat. 1653; 16 U.S.C. 3501 et seq.). It designated various undeveloped coastal barrier islands, depicted by specific maps, for inclusion in the Coastal Barrier Resources System (CBRS). Areas designated were made ineligible for direct or indirect Federal financial assistance that might support development, including flood insurance, except for emergency life-saving activities. Federal expenditures are authorized for activities associated with energy resources; navigation channels; public roads; national security; Coast Guard facilities; wildlife enhancement, protection, and management; public health and safety; and restoration of natural shoreline stabilization systems. The Coastal Barrier Improvement Act (CBIA) of 1990 reauthorized the CBRA and expanded the CBRS by adding new units and enlarging some previously designated units along the Atlantic and Gulf coasts. The CBIA also designated a new category of lands called “otherwise protected areas” (OPA’s). OPA’s are public or private lands that are held for conservation purposes; these areas include national wildlife refuges, national parks and seashores, state parks, and lands owned by private organizations for conservation purposes.

6.4.2 Coastal Zone Management Act. The Virginia Coastal Zone Management Program (VA CZM Program) was established in 1986 to protect and manage Virginia's coastal zone. The Virginia CZM Program is part of a national coastal zone management program, a voluntary partnership between the National Oceanic and Atmospheric Administration (NOAA) and U.S. coastal states and territories authorized by the Coastal Zone Management Act (CZMA) of 1972, as amended. A Federally approved Coastal Program authorizes Virginia to require that Federal actions are consistent with the state's Coastal Program's laws and enforceable policies. The Virginia Department of Environmental Quality (VDEQ) serves as the lead agency for Virginia’s networked coastal management program.

6.4.3 Clean Water Act. Section 404 of the Clean Water Act (CWA) of 1972, as amended (33 U.S.C. s/s 1251 and following) (1977) is the primary law that governs disposal of dredged and fill material in waters of the United States. Waters of the United States include ocean areas, estuaries, streams, ponds, rivers, lakes, and wetlands. The CWA requires any applicant for a federal license or permit for any activity that may result in a discharge into navigable waters to obtain a certification that the discharge will not adversely affect water quality from the state in which the discharge will occur. VDEQ is responsible for 401 Certification, called the Virginia Water Protection permit (VWP). VWP permits issued by DEQ contain conditions to protect water quality in the area of the proposed project. Additionally, a permit must be obtained from the Virginia Marine Resources Commission (VMRC) to build, dump or otherwise trespass upon or over, encroach upon, take or use any material from the beds of the bays, ocean, rivers, streams or creeks within the jurisdiction of Virginia.

7.0 ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION

7.1 Environmental Setting:

7.1.1 Climate. No climatic changes will occur as a result of this localized project.

7.1.2 Geology and Soils. Many factors affect the shape, composition, and structure of beaches after they are renourished. The shape varies with sand supply, sea level change, and wave size. The project will provide for a wider beach offering significant benefits in the form of storm damage reduction. During storms with elevated water levels and high waves, a wide beach performs as an effective energy absorber with the wave energy dissipated across the surf zone and wide beach rather than impacting on the upland structures. The proposed action would remove approximately 1.5 to 2.0 million cy of sand from Sandbridge Shoal. The sediments in the shoal are approximately 96 percent sand, 1.5 percent gravel, and about 2.5 percent fines. Mean grain size at the placement site ranges between 0.25 mm and 0.35 mm, medium grained sand. There would be no significant impacts to sediment quality at the borrow area or at the placement site.

7.1.3 Terrestrial Environment. Some benthic organisms associated with nearshore areas that would be covered by the dredged material will be lost. Studies of sand grain by Ackerman (1996) show that nourished beaches are harder than non-nourished beaches; sand grains tend to be more cemented. This has not been demonstrated to retard or prevent the re-colonization of the beach by interstitial and burrowing fauna. Observations made by the USACE and others at previous beach nourishment projects in Hampton (Buckroe Beach and others) have shown that these species will re-colonize within a year of sand placement. No impacts to dune plants are anticipated, as none are located within the elevations selected for beach nourishment. Avian communities could be temporarily displaced by dredge pipelines, and construction equipment along the beach or may avoid foraging if they are aurally affected (Peterson et al., 2001). However, construction will be short-term and minor and is not expected to interfere with nesting, breeding, or migration of any avian species. Terrestrial reptiles, amphibians, and mammals may be temporarily disturbed but will not be adversely impacted by any aspect of the project. As a result of this evaluation, no significant impacts to the terrestrial environment are expected to occur.

7.1.4 Physical Oceanography. Potential impacts to the physical environment from offshore sand extraction include changes to hydrodynamic and sediment transport processes, as well as the formation of short-lived turbidity plumes. Although the potential impact on shoal currents from bathymetric modification has not been explicitly modeled, near-bed current measurements show large seasonal and event-scale variability, including flow reversals (Valle-Levinson and Lwiza, 1998). Numerical modeling of comparable dredging scenarios off Ocean City, Maryland (Maa et al., 2004) and Outer Banks, North Carolina (Byrnes et al., 2003) shows that increasing shoal depth generally leads to decreased current velocity, sediment convergence, and infilling. Although local velocities immediately downstream of dredged areas may temporarily increase (in the direction of strong along shelf flows), the magnitude of change and the size of the footprint are expected to be relatively small. Alterations of near-bed currents may result in local and short-lived changes in sediment transport pathways in the immediate vicinity of the borrow areas, but the pathways are expected to return to pre-dredging conditions following infilling (Byrnes et al., 2003). Infilling rates and sediment deposited in borrow depressions are expected to reflect natural variations, including storm characteristics and source material.

As waves move shoreward from deeper water and propagate over depth anomalies resulting from removal of material at the borrow site for nourishment, the height, direction, and other characteristics of the waves change. These transformations, called wave shoaling, refraction, reflection, and diffraction, can significantly increase or decrease the transport of sand along the shoreline, resulting in localized erosion and accretion. When evaluating offshore dredging, it is important to consider the possible effect on nearshore wave transformation and changes to wave-induced longshore sediment transport, which in turn may affect shoreline change. Using a range of monochromatic and spectral wave models, Maa and Hobbs (1998), Boon (1998), Basco (1999), and Kelly et al. (2001a) independently show significant wave convergence along Sandbridge Beach. Strong gradients in breaking wave height and angle occur along the entire length of Sandbridge with two pronounced peaks spaced approximately 5 km (Maa and Hobbs, 1998). Refraction of long period waves by Sandbridge Shoal and convergence has been reproduced in all of the independent model runs; however, wave interactions with intermediate scale, shore-oblique bars recently mapped on the lower shoreface off Sandbridge Beach (McNinch, 2004) have yet to be incorporated. Model output from a suite of dredge scenarios generally indicates a reduction in wave height within the borrow area, especially with larger, longer period waves (Kelley and Ramsey, 2001; Kelley et al., 2001b). Refraction contributes to an increase in wave height towards the boundaries of the borrow areas. Offshore wave transformation contributes to a shadow zone of reduced wave energy landward of borrow areas A and B, but also a zone of increased wave energy north and south of the shadow zone. The total length of potentially affected shoreline (~15 km) is approximately two times longer than the combined alongshore dimension of the borrow areas. However, due to the redistribution of breaking wave energy and relative changes in wave direction, relatively small changes in longshore transport potential are predicted; the direction and magnitude of transport potential vary with forcing conditions (Maa and Hobbs, 1998; Kelley et al., 2001a).

Given the predominantly southeast wave climate, an average net transport rate to the north of approximately 300,000 m^3/yr is predicted (Kelley et al., 2001). Kelley, (2001) reports a maximum change (decrease) in net longshore transport potential of about 8,000 m^3/yr for a $1.5x10^6$ m^3 hypothetical extraction, although relative alongshore transport gradients may be locally enhanced. The decrease in northerly-directed sediment transport predicted by the model suggests that more sand may actually accumulate (i.e., accretion) along Sandbridge Beach than prior to dredging, although more discrete locations along the reach of shoreline may experience increased transport divergence (i.e., erosion). Although this change in transport potential may appear significant, representing about 7.5% of the mean annual transport rate, the potential effect of the dredging scenario is an order of magnitude less than the uncertainty associated with the sediment transport calculations and well within the inter-annual transport potential variability which exceeds 100,000 m^3/yr (Kelley et al., 2001).

7.1.5 Noise. The beach re-nourishment, including mobilization, is anticipated to take approximately 3-5 months, depending on weather conditions and equipment breakdown. Operations are expected to continue 24 hours per day, 7 days per week. Bulldozers will be working on the beach continuously, which would impact the ambient noise level, although the impacts would be restricted to the immediate construction reach. Noise pollution and construction activities will be monitored to ensure minimum disturbance to the surrounding community. The offshore pumps are not expected to impact the ambient noise level as they will be far enough from the beach to be a nuisance.

Ambient underwater sound levels are an important consideration in assessing the probability of detrimental effects of dredging sounds. Much of the sound produced during filling of the hopper is associated with propeller and engine noise with additional sounds emitted by pumps and generators; these sounds are continuous in nature. Numerous factors contribute to ambient sounds at a given location, including tidal hydrodynamics, meteorological conditions and sea state, the presence or absence of ice, and sounds of biological origin. It should also be recognized that interpreting underwater sound data may be futile without fundamental studies on biological responses to characteristic dredging sounds (Dickerson, et al., 2001). There is few data exist that adequately characterize sounds emitted by dredge plants that would support objective decisions balancing the need to dredge against relative risk to a fishery resource (Dickerson, et al., 2001).

7.1.6 H**azardous Materials.** Borrow area and beach nourishment activities are not expected to result in the identification and/or disturbance of HTRW, as it has been found that coarse-grained material in a high-energy area is unlikely to be contaminated with HTRW (USACE, 1994). Since small caliber UXO may be encountered in the borrow areas during dredging operations, as a safety precaution, the Corps requires that a screen be placed over the drag head to effectively prevent any of the UXO from entering the hopper and/or being subsequently placed on the beach; the screen will be made of vertical metal bars with a gap of no more than 1.5 inches. This method has been employed successfully in previous sand borrow placement activities at Sandbridge. In addition, a qualitative (QA) reconnaissance munitions beach survey based on both visual observations and analog geophysics (magnetometer) will be periodically conducted during the Sandbridge Beach replenishment operations. The magnetometer survey conducted of the borrow area identified a number of items to avoid; the contractor will not be permitted to dredge within a 100-foot radius of these items. In the event that ordnance is encountered in the borrow area, the screening and/or magnetometer sweeping will all but eliminate the possibility of any ordnance remaining on the new beach after construction.

The contractor would be responsible for proper storage and disposal of any hazardous material such as oils and fuels used during the dredging and beach nourishment operations. The U.S. EPA and U.S. Coast Guard regulations require the treatment of waste (e.g., sewage, gray water) from dredge plants and tender/service vessels and prohibit the disposal of debris into the marine environment. The dredge contractor will be required to implement a marine pollution control plan to minimize any direct impacts to water quality from construction activity. No accidental spills of diesel fuel from the dredge plant or tender vessels are expected.

7.1.7 Water Quality.

7.1.7.1 Placement Site. There will be increased, localized turbidity associated with the beach nourishment operations. Near shore turbidity impacts are directly related to the quantity of fines (silt and clay) in the nourishment material. The medium sized sand grains should allow for a short suspension time and containment of sediment during and after construction. Short-term impacts would involve increased, localized turbidity associated with dredging and disposal operations. However, these impacts are expected to be minimal. The beachfill consists of beach quality sand of similar grain size and composition of indigenous beach sands. Therefore, turbidity impacts will be short-term and spatially-limited to the vicinity of the dredge outfall pipe.

7.1.7.2 Borrow Area. Dredging in the borrow area would result in some short-term negative effects, including localized increases in turbidity and slight decreases in DO. Since the dominant substrate at the borrow area is medium-grain sand, it is expected to settle rapidly, causing less turbidity and less oxygen demand than finer-grained (organic) sediments. Studies (Priest, 1981; Barnard, 1978) have concluded that the turbidity created by a dredging operation is restricted to the vicinity of the operation and decreases significantly with increased distance from the dredge. DO, pH, and temperature all influence the welfare of living organisms in water; without an appreciable level of DO, many kinds of aquatic organisms cannot exist. No appreciable effects on DO, pH, or temperature are anticipated due to the nature of the dredged material (sand), related low levels of organics and biological oxygen demand, and the hydrodynamic influences within the borrow area in the open ocean where the water column is subject to significant mixing and exchange with oxygen rich surface waters.

7.1.8 Air Quality. Criteria air pollutant emissions were estimated for the preferred action using estimates of power requirements, duration of operations, and emission factors for the various equipment types. Multiplying horsepower rating, activity rating factor (percent of total power), and operating time yields the energy used. The energy used multiplied by an emission factor yields the emission estimate. Fuel consumption and operational data from the 2007 nourishment cycle were used to estimate power requirements and duration for each phase of the proposed hopper dredging activity. The horsepower rating of the dredge plant was assumed for each activity as follows: propulsion (5000 hp), dredging (5000 hp), pumping (4000 hp), and auxiliary (2000 hp). Different rating factors were used for dredging, propulsion, and pumping. The duration of dredging was estimated at 130 days. The estimated time to each complete dredge cycle, including idle time, was approximately 3.2 hours per load. It was assumed that about 2,800 yd^3 of material would be moved in each cycle, requiring about 880 trips to excavate enough material to place 2.0 million yd^3 of sand on the beach. The placement and relocation of the nearshore mooring buoys used during pump-out would involve two tender tugboats, a derrick barge, two work barges, and pipeline hauler / crane. It was assumed that the buoy would need to be moved at most five times during the project, with each move taking approximately 12 hours. Emission factors for the diesel engines on the hopper dredge, barge, and tugboats were obtained from EPA's *Compilation of Air Pollutant Emissions Factors, AP-42, Volume 1* (2002). Emission factors for tiered equipment were derived from NONROAD model (5a) estimates. The beach fill related estimates assumed the use of up to four bulldozers and a flat bed truck/ATV, each operating continuously for the duration of the project.

All dredging was assumed to occur on the OCS, whereas 90% of hopper transport and all other emitting activities were assumed to occur over state waters or at the placement site. Total project emissions of nitrogen oxides (NO_x), sulfur dioxide (SO_2), carbon monoxide (CO), volatile organic compounds (VOC), and particulate matter (PM) are presented in Table 1.

Table 1: Estimated emissions for the preferred alternative (tons per year)

Activity	Emissions (tons)					
	NOx	**SO2**	**CO**	**VOC**	**$PM_{2.5}$**	**PM_{10}**
Dredge Vessel (Hopper)						
Dredging	20.6	0.3	4.7	0.5	0.3	0.3
Transit	52.5	0.9	12.1	1.4	0.9	0.9
Pump-out	20.8	0.3	4.8	0.6	0.3	0.3
Idle	4.4	0.1	1.0	0.1	0.1	0.1
Relocation of Mooring Buoy	5.8	0.1	0.1	0.1	0.1	0.1
Beach Fill	12.0	2.2	5.5	0.8	0.9	0.9
Total Emissions	113.6	3.9	3.8	3.5	2.6	27.5
Total Emissions within State	87.8	3.5	3.4	2.8	2.2	21.6
Total Emissions within OCS	25.8	0.4	0.4	0.7	0.4	5.9
Nonpoint + Mobile Source Emissions (Point and Nonpoint + Mobile Emissions) (City of Virginia Beach 2002 from EPA National Emission Inventory)	11,736 12,464	3,008 3,597	86,990 87,570	14,151 14,301	1,314 1,385	5,215 5,334
Virginia Beach 2002 emissions from http://www.epa.gov/air/data/repsst.html?st~VA~Virginia						

The proposed action would result in small, localized, temporary increases in concentrations of nitrogen dioxide (NO_2), SO_2, CO, VOC, and PM. Emissions associated with the dredge plant would be the largest contribution to the inventory. However, the total increases are relatively minor in context of the existing nonpoint and mobile source emissions in the Virginia Beach region (Table 1). Based on the preceding analysis, projected emissions from the Sandbridge Project would not adversely impact air quality given the relatively low level of emissions and the prevailing offshore winds. With the proposed action, the criteria pollutant levels would be well within the national ambient air quality standards. In order to determine if a conformity determination needed to be performed, estimates were made of the portion of total emissions that would occur within state limits. Since the Federal OCS waters attainment status is unclassified, there is no provision for any classification in the Clean Air Act for waters outside of the boundaries of state waters. Calculating the increase in emissions that may occur within the state limits was done by subtracting out the dredging-related and ten percent of transport emissions, since those activities would take place entirely over Federal waters. Projected emissions of NO_x and VOC within state boundaries are within the 100 tons/year threshold for a marginal ozone nonattainment area. Therefore, no conformity determination will be required under 40 CFR Part 93.

7.2 Coastal and Aquatic Resources:

7.2.1 Benthos, Motile Invertebrates, and Fishes.

7.2.1.2 Placement Site. Recovery time of the benthos within both the dredging area and the seaward surf zone is expected to be relatively rapid, although full recovery of both sites by benthos to a condition resembling pre-project conditions may take several years (Nelson, 1993; Newell et al., 1998). In general, the beach will repopulate relatively quickly. Several environmental studies of beach nourishment indicate that there are no detrimental long-term changes in the beach fauna as a result of beach nourishment (Burlas et al., 2001). In order to further determine the effects of beach nourishment activities upon key organisms, the Norfolk District conducted a study in 1987 along the nearby Virginia Beach shoreline (USACE, 1992). The findings of this study are based upon population changes of the mole crab (*Emerita talpoida*), ghost crab (*Ocypode albicans*), calico crab (*Ovalipes ocellatus*), amphipods (*Haustorius arenarius*), and sand worms (*Clymenella torquata*) in response to deposition of material dredged from offshore sources on the resort beach. This study supported the findings of other separate and independent studies, concluding that the greatest influencing factor on beach fauna populations appears to be not the introduction of additional material onto the beach, but rather the composition of the introduced material. The deposited sediments, when similar in composition (grain size and other physical characteristics) to existing beach material (whether indigenous or introduced by an earlier nourishment or construction event), do not appear to have the potential to reduce the numbers of species or individuals of beach infauna (USACE, 1994).

7.2.1.3 Borrow Area. The rate of benthic recovery and degree of diversity following a dredging event depend on a number of factors including: 1) duration and timing of dredging, 2) the type of dredging equipment used to extract the sediment, 3) sediment composition of the mine site, 4) amount of sand removed from the site, 5) the fauna present in the borrow area and surrounding area prior to dredging and their ability to adapt to change, 6) characteristics of the new sediment interface, 7) life history characteristics of fauna that re-colonize, 8) water quality at the site, 9) hydrodynamics of the mine pit and surrounding area, and 10) degree of sedimentation that occurs following dredging. Some of the motile benthic and pelagic fauna, such as crabs, shrimp, and fish, are able to avoid the dredging area and should return shortly after the activity is completed. Most motile epibenthic forms such as crustaceans and a few burrowing fishes such as flounder are rarely found in pumped sediments (USACE, 1992). Impacts to benthos are expected to be temporary in duration, as populations of green and blue algae, acorn worms, and other species tend to repopulate rapidly following dredging. Relatively non-motile benthos, such as worms and molluscs, will be destroyed over much of the area to be dredged. This may result in loss of prey items for finfish following dredging until benthic communities recover. Analysis of sediment core samples taken after dredging has demonstrated that the remaining epibenthic sediments are decimated (Parr, e al, 1978). However, studies have shown that re-colonization in sediments generally occurs rapidly. Organisms that feed by filtering suspended particles from the water are most likely to be negatively impacted by the abrasive action of clay and silt, or by exposure to toxins associated with suspended particles. Some of the specific physiological effects on filter feeding organisms include abrasion of gill filaments, impaired respiration, retarded egg development, survival of larvae, and clogging of gills (Gordon et al. 1972). A USACE study conducted in 2001 demonstrated no extensive beds of filter feeding mollusks at Sandbridge Shoal; the offshore site lies beyond any oyster beds. The coarse-grained sand of the borrow areas, far removed from potential contaminant sources, does not retain toxic sediment contaminants.

In June 1998 and May 1999, the Virginia Institute of Marine Science and the University of New Hampshire conducted a study of the effects of sand dredging on benthic populations forming the bulk of food sources for juvenile finfish in the shallow oceanic waters off the coast of Maryland and Delaware, specifically, Weaver Shoal and Fenwick Shoal. Video sleds, sediment coring, and metered beam trawling were utilized to focus upon areas which provide the most desired sand grain size for commercial sand mining operations. The most abundant species were spotted hake (*Urophycis regia*) and smallmouth flounder (*Etropus microstomus*). Re-colonization occurred naturally within approximately one year of sand mining. The study concluded that, in order to minimize impacts to finfish food supplies and to promote re-colonization of mined areas as rapidly and efficiently as possible, the total removal of a layer of substrate should be avoided and the tactic of leaving small un-dredged areas within an identified borrow area should be instituted. The purpose of this is to create refuge patches that will promote rapid re-colonization and serve as habitat for the mobile benthic species. Dredging activities ending in time for the spring and summer recruitment would favor crustaceans. Dredging operations that begin in the summer and end in time for the fall and winter recruitment season would favor annelids (Diaz, Cutter and Hobbs, 2004). Comparable monitoring between 2002 and 2005 at Sandbridge Shoal revealed no significant difference in macrofaunal abundance between dredged areas (Area B) and controls, suggesting that dredging within Area B has had little impact on habitat value (Diaz et al., 2006). Despite multiple dredging events, the shoal environment continues to host robust macrobenthic and fish communities. In the vicinity of historic dredging, no negative impacts for macrobenthos or demersal fishes have been documented. The overall impact to these organisms is expected to be temporary in nature and not significant.

7.2.2 Submerged Aquatic Vegetation. There would be no effect to submerged aquatic vegetation by the proposed project either offshore or within the area of beach nourishment.

7.2.3 Essential Fish Habitat. The 1996 amendments to the MSA require Federal agencies to consult with NMFS regarding the potential effects of the action on essential fish habitat (EFH), which is defined as those waters and substrates necessary to Federally-managed fish for spawning, breeding, feeding, or growth to maturity. In compliance with MSA, an EFH Assessment has been prepared and appears as Appendix B. The EFH Assessment includes: (1) a description of the proposed action; (2) an analysis of the effects of the action on EFH and associated species; (3) the Federal agency's views regarding the effects of the action on EFH;

and (4) a discussion of proposed mitigation, if applicable. The following narrative is a brief synopsis of this assessment.

Fish occupation of waters within the project impact area is highly variable spatially and temporally. Some of the species are strictly offshore, while others may occupy both near shore and offshore waters. In addition, some species may be suited for open ocean or pelagic waters, while others may be more oriented to bottom or demersal waters. This can also vary between life stages of Federally-managed species. Additionally, seasonal abundance is highly variable, as many species are migratory.

Direct impacts to each finfish species are evaluated on their likelihood of being present, and therefore, potentially physically harmed at either the proposed borrow areas or beach fill placement areas during project construction. Finfish species could potentially be harmed at the borrow area entrainment in the dredge. Pelagic species, such as bluefish and Atlantic butterfish, should be able to avoid the entrainment into the dredge due to their high mobility. Demersal species such as the windowpane flounder and the summer flounder are mobile and should be able to avoid dredge entrainment as well. However, because of their demersal nature, individuals that may remain on the seafloor of the borrow area during dredging could be entrained and destroyed; demersal eggs may be entrained as well. Juveniles are likely more vulnerable than adults due to their slower swimming speed. Finfish species that have eggs and larvae in surface waters may be impacted by the hopper dredge making numerous transits through the borrow area; any eggs in the path of the dredge are likely to be destroyed by the ship's propeller. Because eggs and larvae are widely distributed over the continental shelf, egg destruction is not expected to cause significant impacts to fish populations. While some individual finfish will likely be entrained into the dredge and destroyed, no detrimental impacts to populations of any finfish are expected from the proposed project. Dredging may also result in physical alterations to the substrate of EFH which could cause changes to benthic community assemblages after re-colonization or in unsuitable substrate for spawning of some finfish species. However, significant changes in substrate are not expected because dredging depths would be based on vibracore data to minimize dissimilar substrates (MMS, 2006). Finfish species could also be harmed in the surfzone while sand is being pumped onto the beach however; the majority of fish living nearshore are motile and can easily escape from sand placement. The greatest impacts of sand placement are the initial decrease in fish abundance, potential for gill clogging caused by increased turbidity, and direct burial of demersal fish. These impacts would be short-term and would not cause significant impacts to populations of any finfish.

Indirect impacts to each finfish species could occur as a result of several aspects of the project. EFH species can be adversely impacted temporarily due to the formation of a turbidity plume, sedimentation, and decreased dissolved oxygen (DO) content during the dredging and placement. Potential impacts to juvenile and adult fish from turbidity include gill clogging or abrasion. These fish are motile and would most likely leave the area while dredging and sand placement occurs, significantly decreasing their abundance and diversity in the short-term. Sessile prey organisms that feed by filtering suspended particles from water are likely to be harmed by turbidity and sedimentation. Abrasion, impaired respiration, and reductions in larvae survival are some of the associated effects (MMS, 1997). Populations exposed to the increased turbidity and sedimentation are expected to have a drop in productivity. However, no large concentrations of filter feeding organisms are known to exist in the project area. These impacts would subside upon cessation of construction activities. There is only a minor portion of fine-grained sediment within the material to be dredged and placed, and turbidity can be pronounced locally at both sites naturally as a result of wave re-suspension of bottom sediments at any time of year. For these reasons it is assumed that impacts from turbidity will be very minor. In addition, because of the open nature of the sites, turbidity should decrease as the particles in the water column rapidly dissipate into the surrounding coastal ocean waters. Short-term beneficial impacts could result from the increase in suspended, nutritive material as a food source creating areas of feeding concentrations.

The sandbar shark (*Charcharinus plumbeus*) is designated as having a Habitat Area of Particular Concern (HAPC), which is described in regulations as a subset of EFH that is rare; particularly susceptible to human-induced degradation, especially ecologically important, or located in an environmentally-stressed area. There will be short-term increases in turbidity and settlement associated with dredging and sand placement but they will be localized and temporary. Any minimal turbidity will be very short in duration (i.e., will settle rapidly) and will be generally limited to the vicinity of the dredging and sand placement. It is generally viewed that elevated levels of turbidity generated by trailing suction hopper dredge operations in open ocean waters do not represent a significant ecological impact. Fish can avoid plumes and other organisms can survive short-term elevated turbidity. The beach nourishment area (surf zone) and borrow area are not located within nursery or pupping grounds for the sandbar shark. Given that the shark can be found from the intertidal zone to waters more than 655 feet deep and is widely distributed along the East Coast, the borrow area represents a fraction of available forage habitat.

Adverse effects on EFH species, due to dredging and construction activities, will largely be temporary and minimal within the dredged footprints and beach nourishment areas in the surf zone. In conclusion, the project is not anticipated to significantly impact EFH species or habitat (including HAPC) that may be in the project area. As mentioned previously, a complete assessment of impacts to EFH is included in Appendix B.

7.2.4 Threatened and Endangered Species.

Sea Turtles. The listed sea turtles that could be potentially affected by the proposed action are the loggerhead, green, leatherback, hawksbill, and Kemp's ridley.

The loss of nesting beaches, hatchling disorientation from artificial light, drowning in fishing and shrimping trawls, marine pollution, and plastics and styrofoam have led to the decline of sea turtles. The major known sources of anthropogenic mortality for the leatherback, loggerhead, Kemps ridley, green, and hawksbill sea turtles at nest sites on beaches are coastal construction, motor vehicles, poaching, exotic species such as fire ants, as well as beach armoring and nourishment. In oceanic habitats these known sources of anthropogenic mortality are trawl, purse seins, hook and line, gill net, pound net, and longline and trap fisheries. They also include oil and gas exploration, marine pollution, underwater explosions, hopper dredging, offshore artificial lighting, power plant entrainment and/or impingement, debris entanglement and ingestion, marina and dock construction, poaching, and boat collisions.

Turtle issues associated with dredging are entrainment, which is defined as the direct uptake of aquatic organisms by the suction field generated at the draghead or cutterhead. Sea turtle mortalities due to entrainment during hopper dredging operations have been documented on the East Coast since 1980. The Endangered Species Observer Program, established in 1980, required observers to quantify entrainment of turtles by screening dredged material from hopper dredge intake structures or overflows. By species, loggerheads were the most frequently entrained during hopper dredging, accounting for 67.4 percent of the total entrainment (for turtles identified per species). Green sea turtles and Kemp's ridleys accounted for 11.1 and 2.5 percent of entrainment incidents, respectively. Nineteen percent were unidentified as to species, since only fragments were recovered (Reine and Clark 1998). Over the past 24 years, the USACE and dredging industry have worked to develop protocols, operational methods, and modified dredging equipment to reduce dredging impacts to sea turtles. If dredging occurs from May 1 to November 30, hopper dredges must be equipped with rigid turtle deflectors attached to the drag-head. The deflector is checked throughout every load to ensure that proper installation is maintained.

Turtle nesting issues associated with beach fill include grain size, color, radiance and compaction. In order to minimize impacts on nesting sea turtles, re-nourishment sand should complement natural sand as closely as possible. The principal sediment types associated with the shoal are generally in the category of medium-grained beach quality sand. Mean grain size at the placement site ranges between 0.23 mm on the berm and 0.26 mm on the foreshore. The mean grain size at Sandbridge Shoal is 0.25 mm. The dredged material closely matches the existing beach material, thus sea turtles should not be affected by the type of material used for beach placement.

On April 2, 1993, the NMFS issued a Biological Opinion (BO) for the borrow area dredging and transport to Sandbridge Beach. Due to funding delays, the project was not completed until 1998, at which time the reasonable and prudent measures, and terms, and conditions outlined in the 1993 BO were incorporated into the current project specifications. The Incidental Take Statement (ITS) was updated in 2001 following new information on sea turtles resuscitation, hopper dredge interactions, and reporting requirements. Recent coordination with the NMFS on December 2007, concluded that the current ITS and BO remain valid for the upcoming dredging and beach nourishment operations provided Norfolk District adheres to all reasonable and prudent measures and terms and conditions as outlined in the 2001 ITS and 1993 BO. The NMFS concluded that the proposed project was likely to adversely affect sea turtles, but not likely to jeopardize the continued existence of the species.

In April 2001, the USFWS issued a letter stating that the proposed project is not likely adversely affect sea turtles and in 2002, the USFWS agreed to the Corps' request to monitor for sea turtles only on the sections undergoing beach nourishment, rather than monitor the entire Virginia Beach shoreline. Additionally, the USFWS issued letter dated, October, 10, 2008 stating if the previously mentioned protective measures are followed, the proposed action is not likely to adversely affect Federally listed or proposed species or their critical habitat. The Corps will continue to adhere to conditions of the BO and ITS some of which include the following: if dredging occurs between May 1 and November 30, with the use of a hopper dredge, turtle deflectors will be outfitted on the draghead. Small caliber unexploded ordnance (UXO) may be encountered in the borrow areas during dredging operations. As a safety precaution, the Corps has required that a screen be placed over the drag head to effectively prevent any of the UXO from entering the hopper and/or being subsequently placed on the beach; the screen is made of vertical metal bars with a gap of no more than 1.5 inches.

The ITS issued for this project requires that NMFS approved endangered species observers be on board the dredge during the period of April 1-November 30, or whenever-water temperatures are above 11°C to monitor the hopper spoil, overflow, screening and dragheads for sea turtles and their remains. Observer coverage is required to allow for the screening of 100% of dredged material. On January 31, 2007, the Corps requested that this requirement be waived for the 2007 dredging season as the installation of the screen on the draghead would preclude sea turtles from becoming entrained in the draghead and prevent any sea turtles or sea turtle parts from being observed. The NMFS responded by letter dated February 7, 2007, and agreed that the installation of the screening on the draghead would prevent sea turtles from becoming entrained in the draghead, as the screens prevent sea turtles from becoming entrained in the dredge. NMFS stated it was not necessary to have an observer onboard to inspect for sea turtle parts and agreed to the Corps request to remove the observer requirement for the previous 2007 dredging project. Furthermore, the NMFS stated that removal of the observer requirement did not alter the conclusions reached in the 1993 Opinion and 2001 revisions (See Appendix C for Agency Correspondence).

Additionally, during May 1 and November 30, sections of the beach undergoing beach re-nourishment will be monitored for sea turtles, their nests, and nesting activities. The Norfolk District will employ trained personnel to conduct the monitoring consistent to our agreement with the USFWS. The BO is included as Appendix A to this document.

The last beach nourishment project at Sandbridge was completed in September of 2007. Numerous sea turtle sightings were recorded during dredging operations, but there were no incidents involving sea turtles or whales. Additionally, there were no sea turtle incidents during the nighttime nesting surveys which were conducted nightly at two hour intervals. The area was physically surveyed for the presence of sea turtles, turtle trails, and nests along the high tide line in both directions and through visual inspection in the entire beach fill area for the duration of the project.

Whales. The listed whales that could be potentially affected by the proposed action are the finback, humpback, and right whales. Dredging impacts on marine mammals may result from underwater noise and vessel collisions. It appears that right whales may be somewhat tolerant of the noise, with closer whales exhibiting a more conspicuous avoidance than more distant whales (MMS, 2001). The major known sources of anthropogenic mortality for the right whale, humpback whale, and fin whale are entanglement in commercial fishing gear and ship strikes. Acoustic trauma and habitat degradation also constitute adverse effects. Collision with vessels is the leading human-caused source of mortality for whales; the most lethal and serious injuries are caused by large, fast-moving ships.

The NMFS has established regulations to implement speed restrictions of no more than 10 knots applying to all vessels 65 ft. or greater overall length in certain locations and at certain times of the year along the east coast of the U.S. Atlantic seaboard. The purpose of the regulations is to reduce the likelihood of deaths and serious injuries to endangered North Atlantic right whales that result from collisions with ships (50 CFR, part 224). Since these restrictions are not mandatory for vessels owned or operated by, or under contract to, U.S. Federal agencies, the NMFS has requested all Federal agencies to voluntarily observe the conditions of the proposed regulations when and where their missions are not compromised. Should whales happen to occur during dredging operations, USACE will adhere to NMFS' observer/monitoring program to insure that vessel collisions are avoided. The proposed action is not likely to adversely affect any of these whale species.

Birds. The listed birds that could be potentially affected by the proposed action are the piping plover and roseate tern. Neither species are known to nest on Sandbridge beaches nor is the project area wintering ground. The roseate tern is rare visitor to the mid-Atlantic and would only be in the coastal area of Virginia during the summer. The piping plover is also an uncommon summer resident in the lower Chesapeake Bay. It breeds and forages in Virginia, mostly on the Eastern Shore from March to October. The proposed action is not likely to affect the roseate tern or the piping plover.

Fish. The listed shortnose sturgeon population declines have been attributed to over-fishing, habitat losses, decreased water quality, siltation, and dams. The re-nourishment project will impact epibenthic crustaceans and infaunal polychaetes within the nearshore area that serve as potential prey items for the sturgeon. The majority of the impacts are primarily short-term in nature and consist of a temporary loss of benthic invertebrate populations. The project area constitutes a fraction of the total available forage habitat for the species. Shortnose sturgeons prefer lower salinity than pure seawater. They are capable of entering the open ocean, but hesitant to do so. Therefore, the proposed action is not likely to affect the shortnose sturgeon.

7.3 Socio and Economic Environment:

7.3.1 Socio Economic Resources.

7.3.1.1 Population. The project would have no impact to the population of Virginia Beach or the State of Virginia.

7.3.1.2 Employment / Economy. The project is not expected to impact employment or income in Virginia Beach or the State of Virginia.

7.3.1.3 Tourism / Fishing Industry. There would be short term impacts to seasonal home renters (within the project vicinity) due to the presence of construction equipment and general beach nourishment operations. However, the project will result in an enhanced beach providing visitors with continued beach related recreational activities. The numbers of renters and rental incomes have continually remained consistent in recent years (MMS, 2001). Surf fishing from the beach would be limited (within the project vicinity) during construction operations. Some fish may become entrained in the dredge at the borrow area however, the catch of these species in the dredged material is not significant to the local populations and is insignificant to the number harvested in commercial and recreational fisheries.

7.3.2 Environmental Justice.

The proposed action will not result in any adverse effects on any identifiable minority or low-income communities in the city of Virginia Beach. Census data indicate that the study area itself does not contain any significant concentrations of either low-income or minority populations.

7.3.3 Military Use/Navigation. To prevent conflict between the firing exercises and dredging operations, the following coordination mechanism must be established between the contractor and the Training Center: *The contractor, when operating a dredge, barge, boat, or aircraft in Firing Area 204.52, shall enter into an agreement with the commander of the Fleet Combat Training Center prior to commencing such operations. Such an agreement would prevent undue disturbance to Training Center exercises and danger to dredging operations.* The dredging equipment and the pump-out buoys would be not located within a navigational channel. Since the submerged pipelines run along the ocean floor, boats navigating between the buoys and shoreline would not be affected by the associated disposal activities. While the presence of the pump-out buoys would be a slight inconvenience to mariners, no significant adverse impacts would occur to navigation.

7.3.4 Cultural Resources. The proposed action will have no effect on any known significant cultural resources in the subaerial project area. There are no known resources within the area along the shoreline where the sand will be placed. This is a highly erosive area that has been nourished several times previously. No effect on the Little Island Coast Guard Station is expected from the project because of the distance of the Coast Guard Station from the actual area where sand will be placed and the fact that the Station is located behind the existing dune line. All the construction activities will take place to the east of the existing dune line well beyond the building.

The offshore borrow areas have been surveyed for the presence of historical resources, and numerous anomalies were noted as a result of the 2006 survey. The unidentified magnetic anomalies listed as potentially significant in the 2007 TAR report will be avoided by all bottom-disturbing activites, including anchoring, for a minimum distance of 200 feet. Additionally, the location of the small barge in Area A and the side-scan sonar target in Area B will be avoided for a minimum distance of 500 feet. Avoidance of the two side-scan targets by 500 feet will result in the avoidance of all associated magnetic anomalies as well. Analysis of the subbottom profiler data by tidewater Atlantic Research indicated the presence of a paleochannel feature in the extreme southeastern corner of Borrow Area A. If proposed dredging operations in Borrow Area A will disturb the sediments to a depth that would intersect this feature, the dredging operations will avoid the outermost margins of the paleochannel feature by a minimum distance of 100 feet. However, with such borrow activities there is always the possibility for unexpected discoveries of historical resources. Proper procedures to address such a possibility will be included in the plans and specifications for the construction contract. This proposed action was coordinated with the Virginia Department of Historic Resources (DHR) by letter of May 12, 2008. DHR requested additional information on two aspects of the project: avoidance of the anomalies in the borrow areas and potential effects on the Little Island Coast Guard Station from project construction. After receipt of the additional information requested, DHR replied by letter dated, July 17, 2008, the project would not adversely affect historic properties.

7.3.5 Aesthetics. There will be a short term negative effect on the beach's appearance while the placement of the material on the beach takes place. The equipment used to pump the sand on the beach and contour it will present visual obstacles but they will be temporary, lasting only during the construction of the project. Slight increases in berm height will not reduce ocean views. Ultimately, the impact of the proposed project on the appearance of the beach will be positive because of the increased beach area.

7.4 Regulatory Requirements:

7.4.1 Coastal Barrier Resources Act. The project is not located within the CBRS, although Little Island City Park, considered an Otherwise Protected Areas (OPA), is within project limits. The beach park is located south of Sandbridge and north of the Back Bay Wildlife Refuge. This OPA is listed as part of Back Bay Unit VA 62-P, community number 515531. OPA designations add Federal protection to coastal barriers already held for conservation or recreation, such as national wildlife refuges, national parks and seashores, state and county parks, and land owned by private groups for conservation or recreational purposes. The only Federal funding prohibition within OPA's is Federal flood insurance. Therefore, the project is in compliance with the CBRA.

7.4.2 Coastal Zone Management Act. In accordance with the CZMA and the approved Coastal Zone Management Program of Virginia, the proposed project has been evaluated for consistency with the coastal development policies. A permit will be applied for and a consistency determination will be submitted VMRC and VDEQ. Receipt of all necessary permits will be acquired before the project begins. The permits must be approved prior to construction via Virginia's Joint permit application process.

7.4.3 Clean Water Act. Environmental concerns involving the proposed placement activities have been evaluated under the CWA and a draft Section 404(b)(1) evaluation report has been prepared to address impacts associated with the proposed action. Items discussed in the referenced report include temporary increases in turbidity, temporary loss of benthic communities, and temporary reduction in phytoplankton productivity. The draft Section 404(b)(1) evaluation is included as Enclosure 2 to this document. Appropriate revisions will be incorporated into the final evaluation report if information is received during coordination of this EA that would dictate a need to revise the report. Public notices describing the proposed project and inviting public comment will be published in the local newspaper, as part of the VMRC and VDEQ permitting requirements.

8.0 CUMULATIVE EFFECTS SUMMARY

Cumulative impacts are those impacts on the environment that result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions. This section analyzes the proposed action in context of similar and unrelated actions occurring in the vicinity of the action area. In considering potential cumulative impacts, time crowded perturbations, space crowded perturbations, indirect and synergistic impacts, and combinations thereof were evaluated. Other activities of importance occurring in the vicinity of the project area include beach recreation, coastal development, beach nourishment and navigation channel maintenance, commercial and recreational fishing, military exercises, and shipping traffic. Both beneficial and adverse cumulative impacts could occur when the impacts of the proposed action are considered in context, but the incremental contribution to impacts to air quality, avian communities, beach habitat, marine mammals and sea turtles, benthic communities, finfish and essential fish habitat, and physical processes from the proposed action are minor.

Maintenance nourishment of Sandbridge Beach is projected for approximately every 3-5 years for the next 40 years. Considered in context of past projects at Sandbridge Beach and the adjacent Dam Neck Naval Facility (7-10 year frequency), as well as past and future beach fill along the Virginia Resort Beach, almost the entire shoreline from Cape Henry south to the Back Bay National Wildlife Refuge will continue to be subject to the stresses of such activities. The impacted area would not increase, and the nature of impacts would not change. The intervening periods between nourishments generally allow for physical and biological recovery and equilibration of the subaerial beach and surf zone. Beach nourishment activities are generally considered beneficial to beach recreation, tourism, and property values, but may encourage disturbance or loss of beach, dune, and overwash habitat owing to human activities associated with coastal development. Trampling, artificial lighting, and beach erosion control (e.g., bulkheading) potentially degrade the full range of seabird and sea turtle nesting habitat and interfere with nesting, foraging, parental care, and hatchling behavior (Defeo et al., 2009). Off-road vehicle use is not common practice on Sandbridge Beach, except during construction periods. Beach fill should balance or counter those losses, replacing the dune and beach habitat that would otherwise be lost to erosion or compromised by more aggressive shoreline protection measures. With the respite between maintenance cycles, sensitive biological resources, including infaunal and epifaunal invertebrates, should substantially recover from disturbances, which include burial, reduced prey availability, and emigration (Burlas et al., 2001; Peterson and Bishop, 2005). Most sandy-beach species are adapted to severe physical disturbances, since storms are frequent along the mid-Atlantic coast. Seabirds, including protected species such as piping plovers, should benefit from the long-term nesting habitat that would certainly disappear with unmitigated coastal erosion. In general, behavior modifications and displacement from preferred nesting and foraging areas will be temporary.

Not all beach restoration projects along Virginia Beach use the same offshore borrow area, but both the Corps of Engineers and Navy use Sandbridge Shoal. The long-term use of Sandbridge Shoal requires careful resource management, as the shoal will not naturally recover the volume of sand that is dredged. The 2 million cubic yards of sand potentially removed in this proposed action represents 6% of the estimated volume remaining in the main shoal body (~30 x106 m3). Considered in combination with past dredging operations, the cumulative volume of sand removed through 2010 will represent less than 25% of fairly conservative volume estimates of Sandbridge Shoal. The shoal's function as habitat may be adversely affected, but to date, there has been limited evidence of any sustained disturbance beyond transient and localized impacts to a wide range of benthic and pelagic biota (Diaz et al., 2006). Areas of the shoal where sediment grain-size is incompatible with nourishment grain size requirements, as well as other no-dredge areas such as the submarine cable zone, will remain undisturbed, serving as feeder zone for benthic recolonization and natural bottom habitat. Additionally, since borrow areas are not typically dredged perfectly flat relative to the adjacent seafloor, a portion of the dredge areas will remain morphologically intact.

Given the likelihood of future dredging at Sandbridge Shoal, it is important to fully consider the potential impacts of continued dredging. Incremental dredging is expected to result in decreasing wave convergence in the lee of the shoal and increasing reduction in annual net northerly sediment transport (Maa and Hobbs, 1998; Kelley and Ramsey, 2001a). To date, approximately ~6x106 m3 of OCS sand have been excavated from the shoal, representing approximately 20% of the estimated shoal volume (~30 x106 m3). Kelley and Ramsey (2001b) consider the potential wave transformation effect of dredging 3 m of sand for the equivalent extraction volume of 12.3 x106 m3 (5.3 x106 m3 at Area A and 6.9 x106 m3 at Area B). Kelley and Ramsey (2001b) estimate a maximum change (decrease) in longshore transport rates of approximately 25,000 m3/yr. The potential effect is minor in context of the inherent variability in transport potential owing to the incident wave climate, which amounts to 20 to 35% of the mean annual net transport potential (~100,000 m/yr).

Prominent shoals or broad sand bodies are often the primary target for dredging, but are also considered valuable benthic and fish habitat. The importance of sand shoal habitats to sea turtles and other sensitive biota is largely unknown. The areal extent of seafloor disturbance is governed by dredging cut depth and thickness of available sand deposits. The currently planned project is expected to impact approximately 150-300 acres of seafloor, but no more than 500 acres. These habitats are naturally dynamic and physically-dominated, making resident biota fairly resilient. The proposed action and foreseeable actions will not result in significant effects on sensitive biological resources. It is likely that recolonization of benthic fauna will occur rapidly by migration and larval recruitment (see EFH Assessment). Long-term impacts will be limited provided areas being dredged are rotated, which has been the case of the first five cycles. Cumulative impacts to EFH and finfish occur from a vast array of sources, including neighboring navigation channel dredging, and are discussed in the attached EFH Assessment (Appendix B).

The most influential of impacts on EFH, finfish, and shellfish are regulated recreational and commercial fishing activities that conduct unsustainable fishing practices and policies. Nearly one third of U.S. marine fisheries have been officially designated as overfished or nearly so; unsustainable harvesting practices reduce recruitment, decrease spawning stock, and decrease overall populations (Defeo et al., 2009). Gillnet fishing may be conducted for fish species such as the spiny dogfish and striped bass. Some bycatch is caught along with the targeted species, and this could potentially reduce the population numbers of non-targeted organisms, sublegal size fish and prey species. Many commercially-caught fish species, such as bluefish and Atlantic croaker, are caught by rod and reel or hand line. Impacts include mortality of catch released because of size limits or species prohibitions. If anchoring takes place, there may be some bottom disturbance as well. Trawl fisheries have targeted bottom fish such as grey seatrout and summer flounder or water column species such as bluefish. Traditional bottom trawls have been shown to remove bottom dwelling organisms such as brittle stars and urchins as well as polychaetes. Colonial epifauna have also been shown to be less abundant in areas disturbed by bottom trawling. This epifauna provides habitat for shrimp, polychaetes and small fish which are potential prey species for commercially desirable fish species. Seafloor areas that have been heavily trawled may bear tracks where trawl doors have gouged into the sediment, changing the sediment surface and in other areas the trawl has flattened the sediment surface reducing habitat for managed species and their prey. Traditional trawl techniques were known to be nonselective in their catch thus having the potential to reduce both prey species and year classes of managed species not yet mature. Longline fishing for species such as some coastal sharks is also expected to occur. Longlining may result in the death of some juvenile and non-target fish species. Recreational anglers have also caught designated EFH species within the vicinity of the borrow areas (i.e. bluefish, cobia, striped bas, king mackerel) via rod and reel, power trolling, and spear fishing. Mortality of some species is expected from the bycatch of non-target species and sub-legal catches. Additionally, disruption of bottom habitat can occur from the anchoring of recreational boats. Benthos and fish caught by the anchor may be destroyed. Repeated anchoring in same location can lead to patches void of benthic organisms. It can reasonably be assumed that Virginia will continue to license and permit recreational vessels and operations, which do not fall under the purview of a Federal agency. If recreational activity increases, the number moralities may continue to increase as well.

Vessel activity associated with dredging and fisheries would be added to the existing commercial shipping and naval vessel traffic using the Chesapeake Bay ports. Air emissions from the construction activities are extremely small in context of the existing point and non-point emissions that contribute to moderate air quality conditions. The impacts on water quality from beach nourishment and channel maintenance activities, including elevated turbidity and introduction of nutrients and contaminants, are short in duration and limited to the placement and dredging location. The impacts may be influenced by seasonal fluctuations in natural river and tidal inlet exchange. Routine discharges from dredge and service vessels are not expected to contribute appreciably to degraded water quality. Oil spills, although nonroutine from vessel activity, are potentially the most destructive pollution source impacting sand beaches and biological resources. Runoff from agriculture, stormwater, and other sources carry pathogens, contaminants, and excess nutrients into coastal waters (Defeo et al., 2009). These can lead to reproductive failure, deformations, mortality and contribute to locally anoxic habitats. Impacts from the nonpoint sources of pollution are expected to continue. Dredge plants and support vessels, like military, shipping, and fishing activities, may contribute to disrupted feeding, loss of prey, noise disruption, and possible collision and entrainment of finfish and sea turtles. Military activities, including ordnance testing, sonar testing, and operational exercises, may affect listed turtle and marine mammal species. Since sea turtles and pelagic fish are highly migratory, the disturbances discussed above can generally be avoided. The same species are likely to be affected by human activities throughout their geographic range. The mitigation measures considered integral to the project are adopted for the express purpose of reducing these risks.

9.0 CONCLUSION

The project will provide for a wider beach offering significant benefits in the form of storm damage reduction. Maintaining and restoring dimensions of the beach will aid in reducing shoreline erosion and provide greater storm protection, thus improving the size and quality of habitats for shoreline wildlife. Re-establishing beach habitat that supports a variety of associated flora and fauna contributes to the success and continual survival of several species such as sea turtles and shorebirds. The proposed action would have no significant environmental impacts on the existing environment. Mitigation measures, such as those specified in the referenced Biological Opinion, will be required. The implementation of the proposed action would not have a significant adverse impact on the quality of the environment, and an environmental impact statement is not required.

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Figures

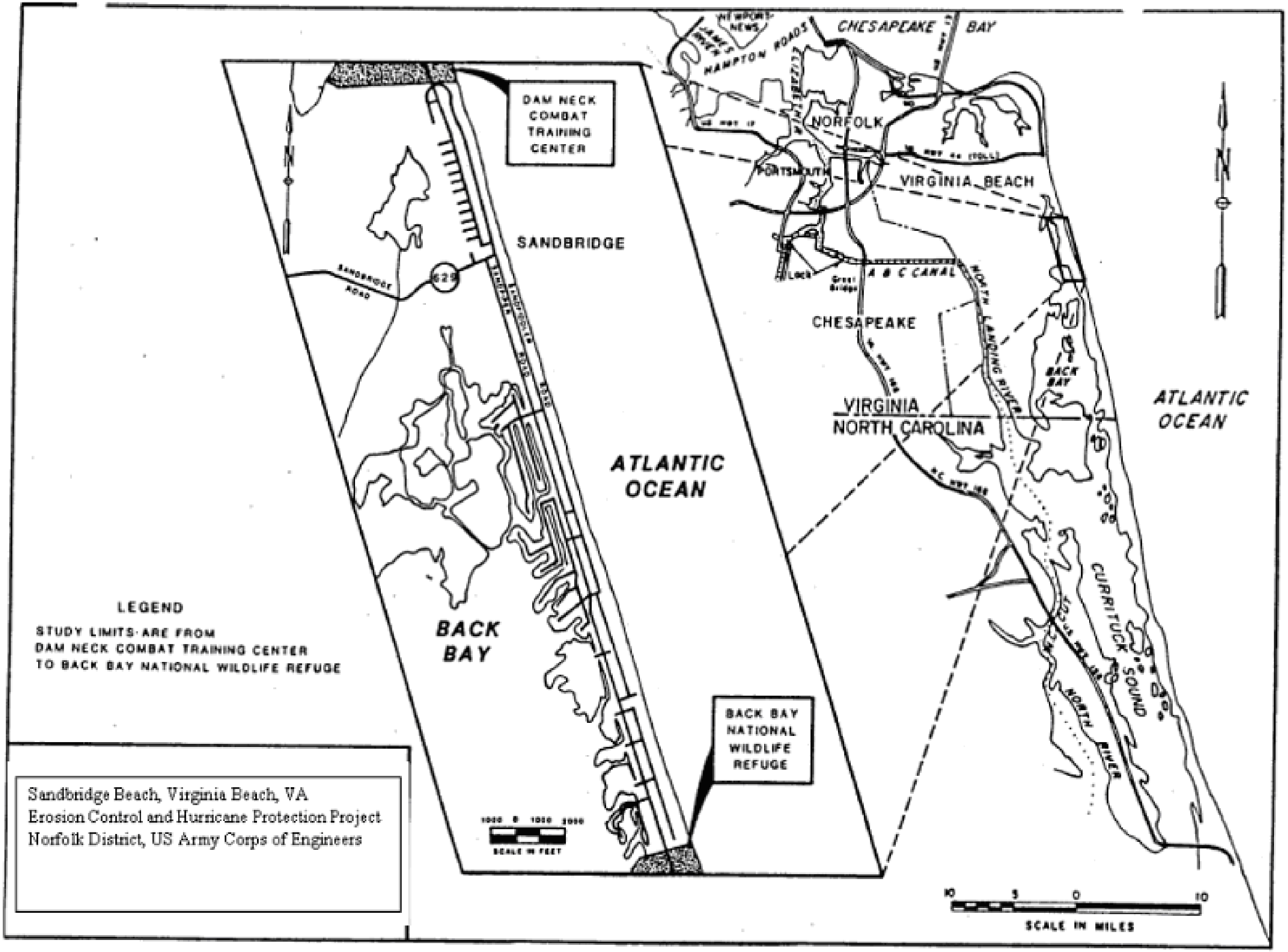
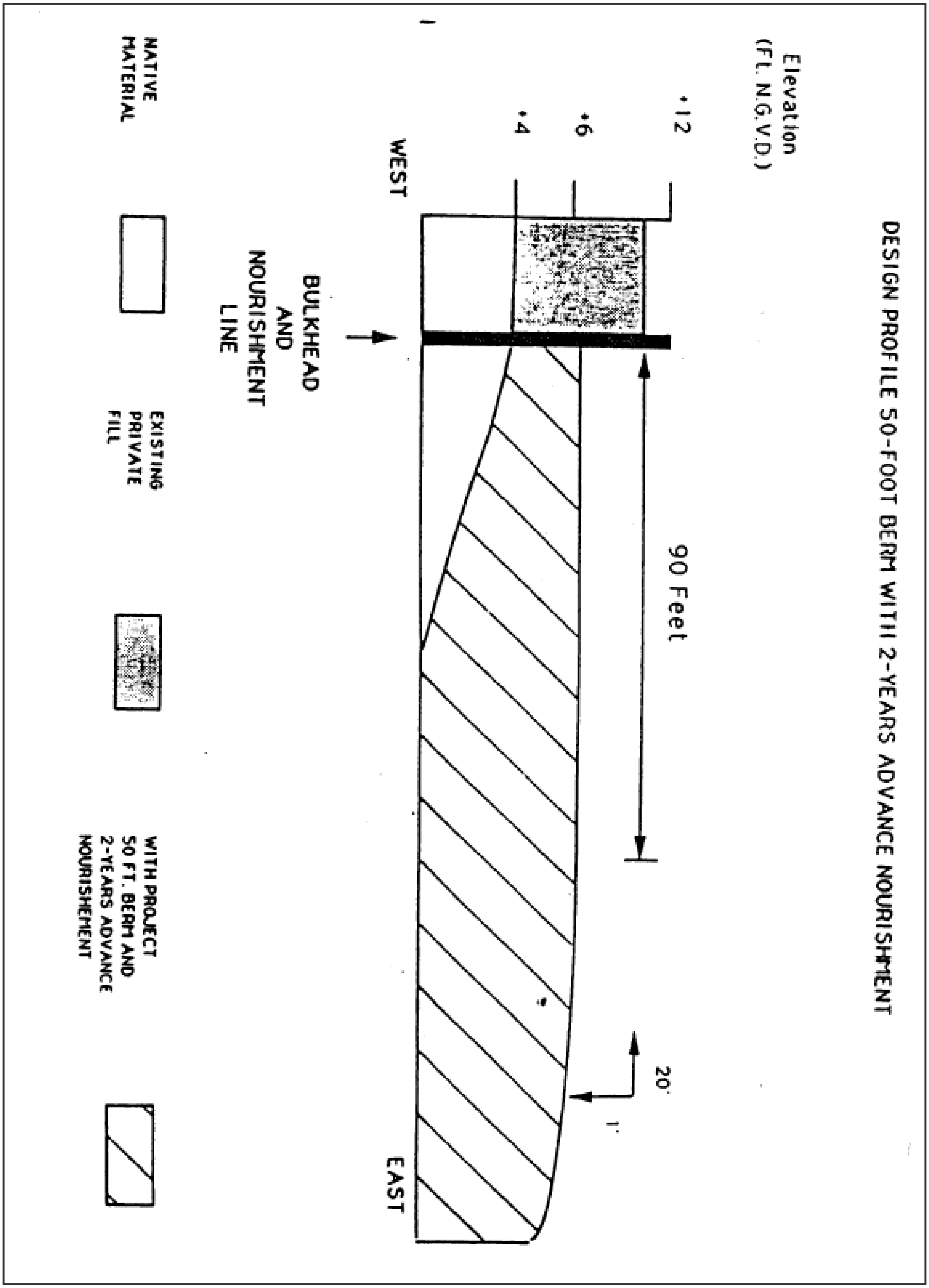
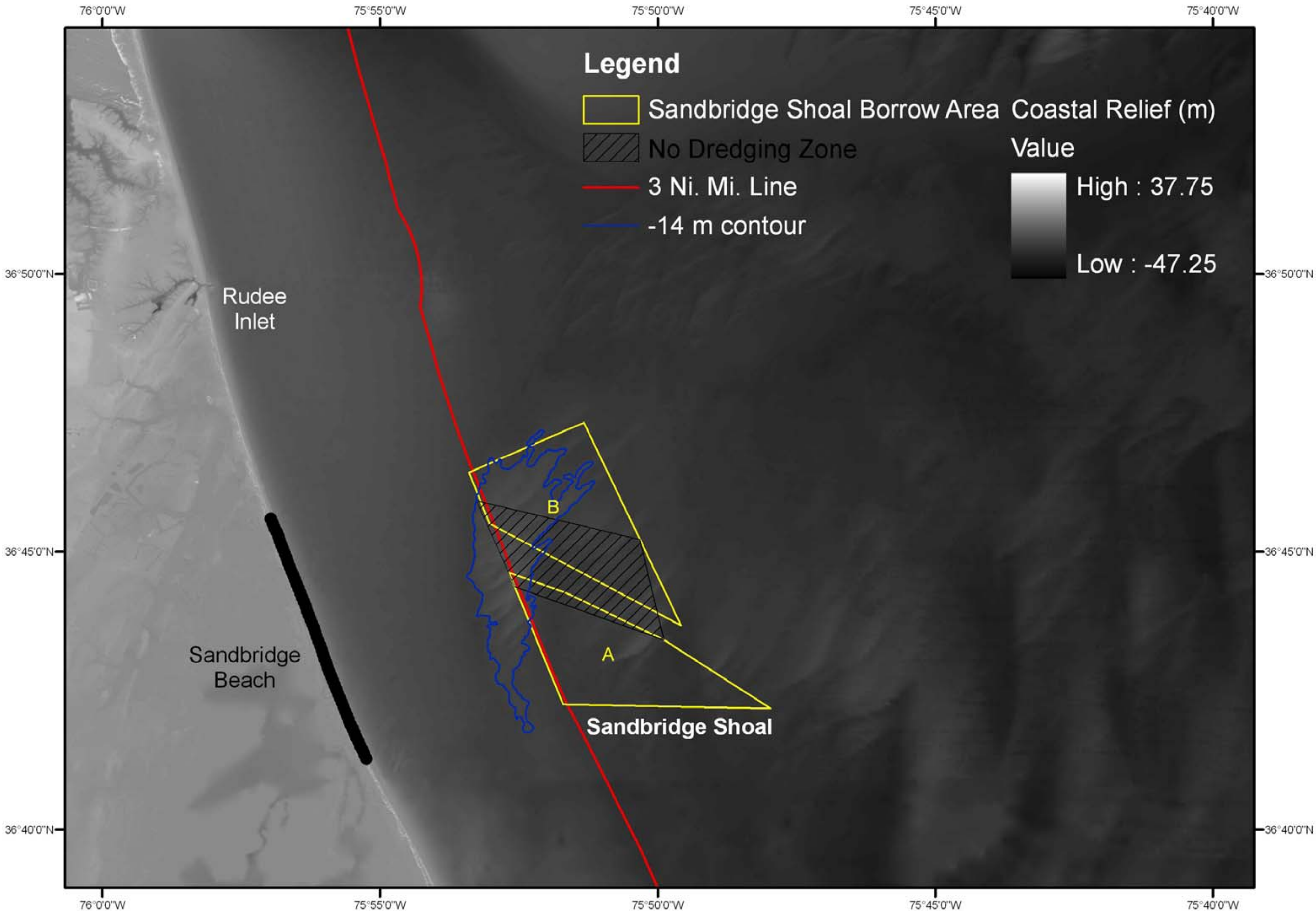

CHESAPEAKE BAY
NEWPORT NEWS
HAMPTON ROADS
NORFOLK
PORTSMOUTH
VIRGINIA BEACH
A & C CANAL
CHESAPEAKE
NORTH LANDING RIVER
BACK BAY
VIRGINIA
NORTH CAROLINA
ATLANTIC OCEAN
CURRITUCK SOUND
NORTH RIVER
SCALE IN MILES
DAM NECK COMBAT TRAINING CENTER
SANDBRIDGE
SANDBRIDGE ROAD
629
ATLANTIC OCEAN
BACK BAY
BACK BAY NATIONAL WILDLIFE REFUGE
SCALE IN FEET
LEGEND
STUDY LIMITS ARE FROM
DAM NECK COMBAT TRAINING CENTER
TO BACK BAY NATIONAL WILDLIFE REFUGE
Sandbridge Beach, Virginia Beach, VA
Erosion Control and Hurricane Protection Project
Norfolk District, US Army Corps of Engineers

Figure 1



DESIGN PROFILE 50-FOOT BERM WITH 2-YEARS ADVANCE NOURISHMENT
Elevation
(Ft. N.G.V.D.)
+12
+6
+4
WEST
EAST
90 Feet
20'
1'
BULKHEAD
AND
NOURISHMENT
LINE
NATIVE
MATERIAL
EXISTING
PRIVATE
FILL
WITH PROJECT
50 FT. BERM AND
2-YEARS ADVANCE
NOURISHMENT

Figure 2



76°0'0"W
75°55'0"W
75°50'0"W
75°45'0"W
75°40'0"W
36°50'0"N
36°45'0"N
36°40'0"N
Legend
Sandbridge Shoal Borrow Area
No Dredging Zone
3 Ni. Mi. Line
-14 m contour
Coastal Relief (m)
Value
High : 37.75
Low : -47.25
Rudee Inlet
Sandbridge Beach
B
A
Sandbridge Shoal

Figure 3

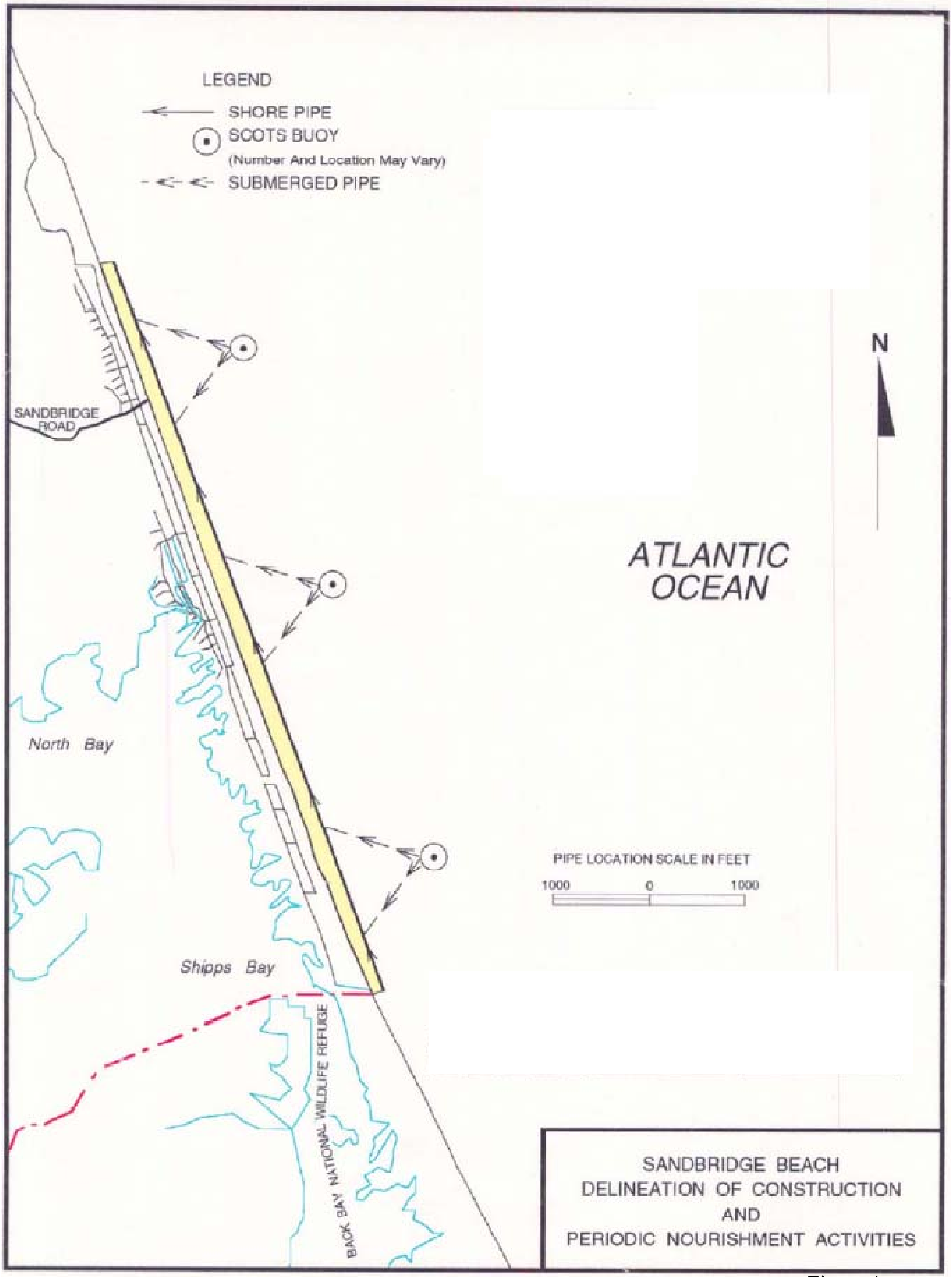

LEGEND
SHORE PIPE
SCOTS BUOY
(Number And Location May Vary)
SUBMERGED PIPE
SANDBRIDGE ROAD
N
ATLANTIC OCEAN
North Bay
Shipps Bay
PIPE LOCATION SCALE IN FEET
1000
0
1000
BACK BAY NATIONAL WILDLIFE REFUGE
SANDBRIDGE BEACH
DELINEATION OF CONSTRUCTION
AND
PERIODIC NOURISHMENT ACTIVITIES

Figure 4

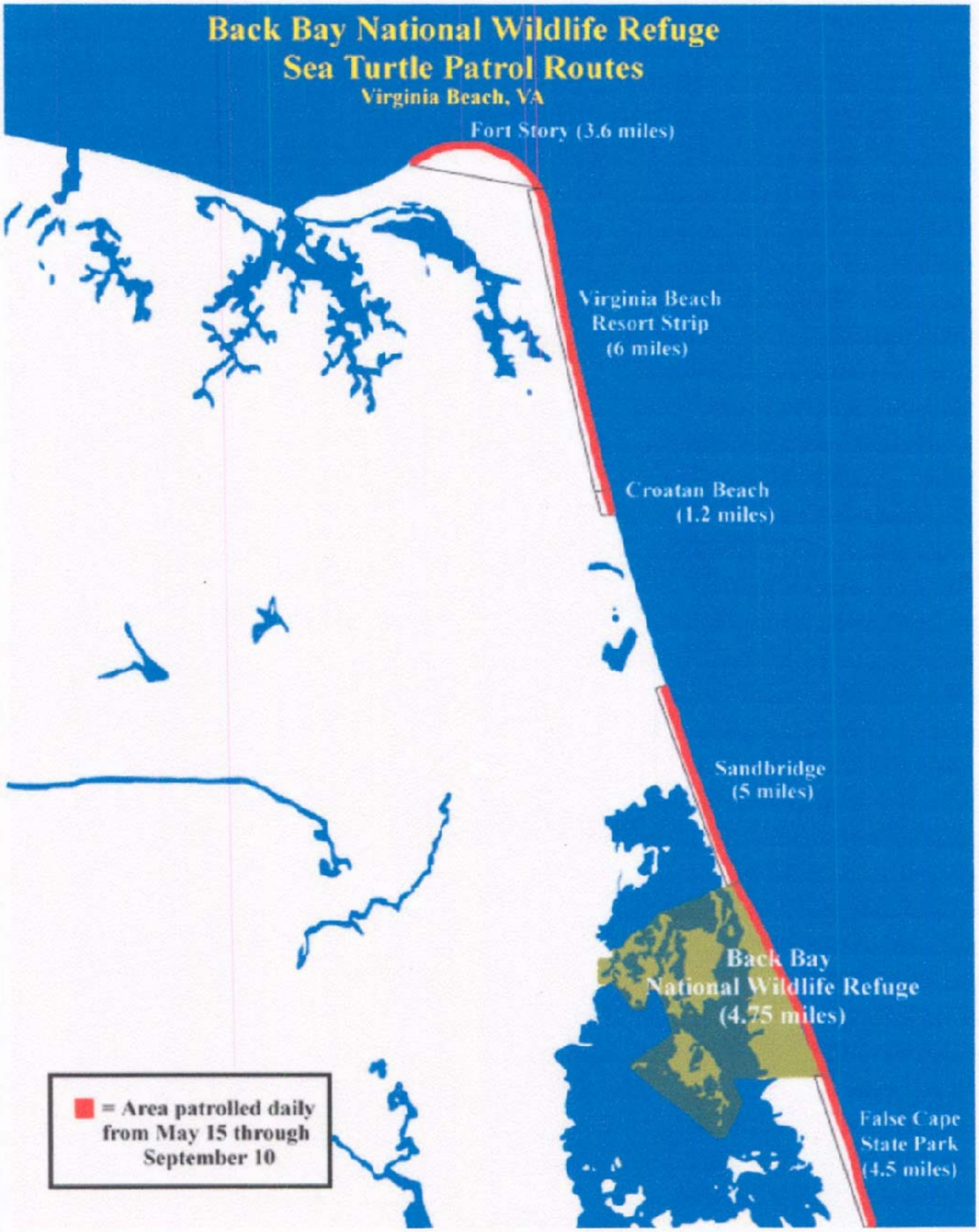
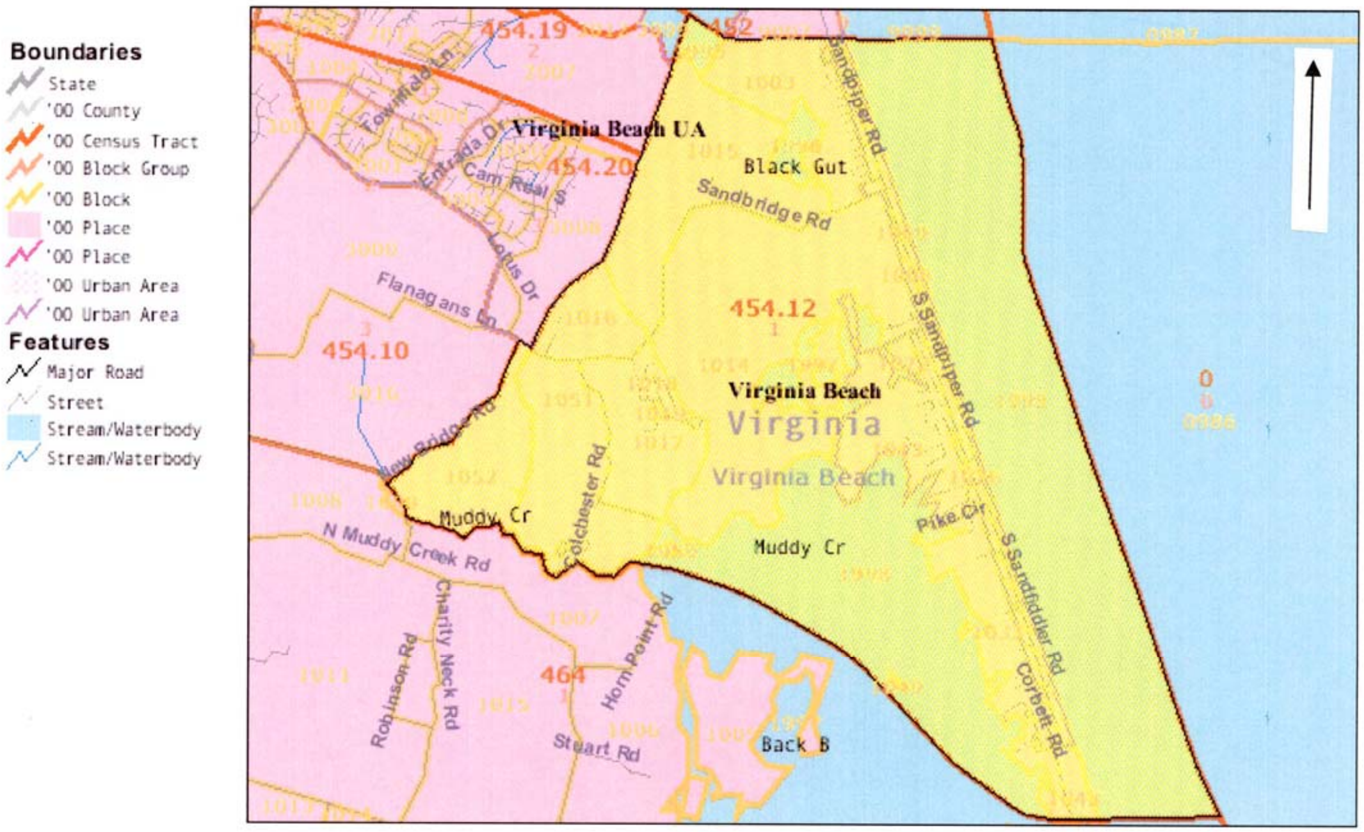

Back Bay National Wildlife Refuge
Sea Turtle Patrol Routes
Virginia Beach, VA
Fort Story (3.6 miles)
Virginia Beach
Resort Strip
(6 miles)
Croatan Beach
(1.2 miles)
Sandbridge
(5 miles)
Back Bay
National Wildlife Refuge
(4.75 miles)
False Cape
State Park
(4.5 miles)
= Area patrolled daily
from May 15 through
September 10

Figure 5

City of Virginia Beach Census Tract 454.12



7 miles across

Figure 6

Enclosures

ENCLOSURE 1
SANDBRIDGE BEACH EROSION CONTROL
AND HURRICANE PROTECTION PROJECT
VIRGINIA BEACH, VIRGINIA
SUMMARY CONSISTENCY DETERMINATION

CONSISTENCY REVIEW: Information presented in this summary consistency determination can be found in the accompanying Draft Environmental Assessment, dated April, 2009.

PROJECT DESCRIPTION: This project will involve beach nourishment at the Sandbridge oceanfront, an area approximately 5 miles long and 125 feet wide. The specific beach area covered extends from the U.S. Naval Fleet Anti-Air Warfare Training Center at Dam Neck to the north to Back Bay National Wildlife Refuge to the south. The project dimensions include a 50-foot wide berm at an elevation of 6 feet North American Vertical Datum (NGVD) with a foreshore slope of approximately 1:20 (one vertical value to 20 horizontal) for a distance of approximately 5 miles. The designated borrow site is Sandbridge Shoal, located approximately 3 nautical miles from the shoreline, outside of Virginia's territorial sea

PROPERTY CLASSIFICATION: The project would occur upon lands included in the Commonwealth of Virginia's coastal zone.

IMPACTS TO RESOURCES/USES OF THE COASTAL ZONE: See table.

DETERMINATION: Based upon evaluation of impacts analyzed in the Draft Environmental Assessment, the Norfolk District Corps of Engineers has determined that the proposed project will be undertaken in a manner consistent to the maximum extent practicable with the Commonwealth of Virginia's Coastal Zone Management Program.

FEDERAL CONSISTENCY DETERMINATION
COASTAL ZONE MANAGEMENT ACT OF 1972, AS AMENDED
VIRGINIA COASTAL RESOURCES MANAGEMENT PROGRAM
SANDBRIDGE BEACH, VIRGINIA BEACH, VIRGINIA

Enforceable Program	Approval/Permit Obtained
1. Fisheries Management	Finfish and Shellfish: No significant impact as determined in EA. TBT Regulatory Program: No TBT possession, sale, or use related to project (N/A).
2. Subaqueous Lands Management	Encroachment upon state-owned bottom – will obtain VMRC Permit. Activity involves discharge of fill into waters of the United States – State Water Quality Certification will be obtained from DEQ. Previous VMRC Permit #01-0951 (exp. date 07/31/06) Previous DEQ Permit #90-0474 (exp. date 10/01/07)
3. Wetlands Management	No wetlands impacts (N/A)
4. Dunes Management	No destruction or alteration of primary dunes related to this project (N/A).
5. Non-point Source Pollution Control	Implementation of BMP's during construction.
6. Point Source Pollution Control	No VPDES impact. State Water Quality Certification under Section 401 of the Clean Water Act will be obtained. Involves discharges of fill material (sand) into waters of the United States.
7. Shoreline Sanitation	No activities related to installation of septic tanks (N/A).
8. Air Pollution Control	Although there will be minor air pollution increases from construction equipment, these increases will be short-term and below *de minimus levels*. Clean Air Act conformity determination completed in EA.

ENCLOSURE 2

SECTION 404 (b)(l) EVALUATION REPORT
SANDBRIDGE BEACH EROSION CONTROL AND HURRICANE PROTECTION PROJECT
VIRGINIA BEACH, VIRGINIA
Draft

1. **PROJECT DESCRIPTION.**

a. **Location.** The project area is located within the city of Virginia Beach, VA. It is approximately 16 miles east of Norfolk, VA and just north of the Back Bay National Wildlife Refuge. Sandbridge Beach is located on a barrier island separating the Atlantic Ocean on the east, from Back Bay to the west. It is a residential community of mostly year round residents, rental properties and summer homes located approximately 5 miles south of Virginia Beach's "resort strip".

b. **Description of the Proposed Action.** The proposed action would involve beach nourishment at the Sandbridge oceanfront, an area approximately 5 miles long and 125 feet wide. The specific beach area covered extends from the U.S. Naval Fleet Anti-Air Warfare Training Center at Dam Neck to the north to Back Bay National Wildlife Refuge to the south. The project dimensions include a 50-foot wide berm at an elevation of 6 feet North American Vertical Datum (NGVD) with a foreshore slope of approximately 1:20 (one vertical value to 20 horizontal) for a distance of approximately 5 miles. The designated borrow site is Sandbridge Shoal, located approximately 3 nautical miles from the shoreline, outside of Virginia's territorial sea. There are two designated borrow areas within Sandbridge Shoal, Area B to the north and Area A to the south; depths range from 30 to 65 feet. The area between the two borrow sites is off limits due to the presence of a buried Navy submarine communications cable. Beach quality sand would most likely be removed by trailing suction hopper dredge. The hydraulic dredge would pump the material ashore for dispersal as slurry, through a pipeline deployed on the seabed. The hopper dredge is equipped with drag heads and a hopper which collects sand. When the hopper is full, material is transported to a pump out buoy located offshore. The material would then be pumped through a discharge pipeline, which runs along the ocean floor, and up onto the beach where bulldozers and graders will distribute the material. Approximately 1.5 to 2.0 million cubic yards (cy) of beach quality sand would be placed on the beach approximately every 3 years depending upon weather conditions, availability of funding, and behavior of subsequently placed material at the project site. The cycle may occur less often, but probably no less than once every 5 years.

c. **Authority and Purpose.** Sandbridge Beach was authorized by Section 1(a) of the Water Resources Development Act of 1974 (Public Law 93-251, 93rd Congress, H.R. 10203, 7 March 1974). The purpose of the proposed action is to provide protection from erosion induced damages and also to provide limited protection to the beach and to residential structures from storm damage. The Sandbridge oceanfront is vulnerable to direct wave attack during storms when greater than normal tide levels overtop the backshore. Sandbridge Beach was last re-nourished in 2007.

d. **General Description of Dredged or Fill Material.**

(1) **General Characteristics of Material.** The borrow area is a source of high quality medium to coarse sand. It is comprised of a large, exposed deposit of sand that varies in thickness and is estimated to be approximately 96 percent sand, 1.5 percent gravel, and about 2.5 percent fines.

(2) **Quantity of Material.** Approximately 1.5 to 2.0 million cy of beach quality sand would be removed from the shoal and placed on Sandbridge Beach.

(3) **Source of Material.** The sand borrow source is Sandbridge Shoal, located approximately 3 nautical miles from the shoreline.

e. **General Description of the Discharge Site.**

(1) **Location.** Sandbridge Beach. The specific beach area covered extends from the U.S. Naval Fleet Anti-Air Warfare Training Center at Dam Neck to the north and to Back Bay National Wildlife Refuge to the south.

(2) **Size.** The beach is approximately 125 feet wide and approximately 5 miles long. The project dimensions include a 50-foot wide berm at an elevation of 6 feet NGVD with a foreshore slope of approximately 1:20 (one vertical value to 20 horizontal).

(3) **Type of Discharge Site.** Oceanfront beach.

(4) **Types of Habitats.** The site is a barrier island separating the Atlantic Ocean from Back Bay, a shallow fresh-water sound. The sound-side is dominated by salt marsh wetland. The dune and beach habitat is located ocean side of the barrier island and has distinct segments including the backshore, foreshore, and nearshore.

(5) **Timing and Duration of Discharge.** Re-nourishment is expected to occur between 2010 and 2011 and would require several months to complete. Beach nourishment would probably occur no less than once every 5 years. Dredging for the project has historically occurred predominantly between the months of April and October to avoid winter sea conditions. Future dredging could potentially occur during any month of the year, but substantial winter dredging would be unlikely because of greater ocean wave energy and resultant higher risk to ships and crew as well as difficulty of operation. The beach re-nourishment, including mobilization, is anticipated to take approximately 3-5 months, depending on weather conditions and equipment breakdown.

(6) **Description of Disposal Methods.** Beach quality sand would be removed by either hydraulic cutterhead suction dredge or by trailing suction hopper dredge. The hydraulic dredge would pump the material ashore for dispersal as slurry, through a pipeline deployed on the seabed. The hopper dredge is equipped with drag heads and a hopper which collects sand. When the hopper is full, material is transported to a pump out buoy located offshore. The material would then be pumped through a discharge pipeline, which runs along the ocean floor, and up onto the beach where bulldozers and graders will distribute the material.

2. **FACTUAL DETERMINATIONS.**

a. **Physical Substrate Determinations.**

(1) **Substrate elevation and slope.** The horseshoe-shaped shoal is characterized as a northward and eastward thinning wedge of sand approximately 48 km² (157,480 ft²) in area and up to 6 meters (20 ft) thick. Maximum relief over the ambient shelf surface is about 4 meters (13 ft).

(2) **Sediment type.** The principal sediment types associated with the Sandbridge Shoal are generally in the category of medium-grained sand. Substrate at the shoal is "clean sand" a mean grain size of 0.2 mm, with little silt or clay content. Mean grain size at the placement site ranges between 0.25 mm and 0.35 mm.

(2) **Dredged/fill material movement.** The average erosion rates for the Sandbridge shoreline range from 2 to10 feet per year. The net sediment transport is toward the north; the north literal transport is contributed by wave energy and northerly currents related to the circulation associated with the Chesapeake Bay entrance.

(4) **Physical effects on benthos.** There would be temporary disruption of the aquatic community. Non-motile benthic fauna within the project area will be lost due to proposed operations, but should repopulate within several months after dredging completion. Some of the motile benthic and pelagic fauna, such as crabs, shrimp, and fishes are able to avoid the disturbed area and should return shortly after the activity is completed. Larval and juvenile stages of these forms may not be able to avoid the activity due to limited mobility. Recovery time of the benthos within both the dredging area and the seaward surf zone is expected to be relatively rapid, although full recovery of both sites by benthos to a condition resembling pre-project conditions may take several years. Several environmental studies of beach nourishment indicate that there are no detrimental long-term changes in the beach fauna as a result of beach nourishment.

(5) **Other effects.** No other effects are anticipated.

(6) **Actions taken to minimize impacts.** The sand to be placed at the site are similar in granulometry to those that exist at the beach re-nourishment site, therefore, no further actions are deemed necessary. There will be increased, localized turbidity associated with the beach nourishment operations. Near shore turbidity impacts are directly related to the quantity of fines (silt and clay) in the nourishment material. The medium sized sand grains should allow for a short suspension time and containment of sediment during and after construction. Short-term impacts would involve increased, localized turbidity associated with dredging and disposal operations, however these impacts are expected to be minimal.

b. **Water Circulation/Fluctuation, and Salinity Determination.**

(1) **Water.** Dredging in the borrow site would result in some short-term negative effects, including localized increases in turbidity and slight decreases in dissolved oxygen (DO). Since the dominant substrate at the borrow site is medium-grain sand, it is expected to settle

rapidly, causing less turbidity and less oxygen demand than finer-grained (organic) sediments. Dredging within the shoal would have no significant impact on salinity, water chemistry, clarity, color, odor, taste, dissolved gas levels, nutrients, or eutrophication characteristics of the adjacent areas.

(2) **Current patterns and circulation.** Potential impacts to the physical environment from offshore sand extraction include changes to hydrodynamic and sediment transport processes, as well as the formation of short-lived turbidity plumes. Although the potential impact on shoal currents from bathymetric modification has not been explicitly modeled, near-bed current measurements show large seasonal and event-scale variability, including flow reversals. As waves move shoreward from deeper water and propagate over depth anomalies resulting from removal of material at the borrow site for nourishment, the height, direction, and other characteristics of the waves change. These transformations, called wave shoaling, refraction, reflection, and diffraction, can significantly increase or decrease the transport of sand along the shoreline, resulting in localized erosion and accretion. Although local velocities immediately downstream of dredged areas may temporarily increase (in the direction of strong along shelf flows), the magnitude of change and the size of the footprint is expected to be relatively small. Alterations of near-bed currents may result in local and short-lived changes in sediment transport pathways in the immediate vicinity of the borrow areas, but pathways are expected to return to pre-dredging conditions following infilling.

(3) **Normal water level fluctuations.** Tidal action would not be affected.

(4) **Salinity gradients.** The project would have no impact on salinity.

(5) **Actions that will be taken to minimize impacts.** No other actions that would minimize impacts on water circulation/fluctuation and salinity is deemed necessary.

c. **Suspended Particulate/Turbidity Determinations.**

(1) **Expected changes in suspended particulate and turbidity levels in the vicinity of the disposal site.** There will be increased, localized turbidity associated with the beach nourishment operations. The medium sized sand grains should allow for a short suspension time and containment of sediment during and after construction. The beachfill consists of beach quality sand of similar grain size and composition of indigenous beach sands therefore, turbidity impacts will be short-term and spatially-limited to the vicinity of the dredge outfall pipe.

(2) **Effects on the chemical and physical properties of the water column.**

(a) **Light penetration.** Possible short-term reduction resulting from temporary increase in turbidity.

(b) **Dissolved oxygen.** There may be slight reductions as compounds in dredged material are oxidized and nutrients are utilized by bacteria.

(c) **Toxic metals and organics.** None identified.

(d) **Pathogens.** No pathogens are expected to be released into the water column.

(e) **Esthetics.** No long-term esthetic changes will result from the proposed action.

(f) **Others as appropriate.** None identified.

(3) **Effects on biota.**

(a) **Primary production, photosynthesis.** Primary production and photosynthesis would not be significantly impacted.

(b) **Suspension/filter feeders.** No significant effects.

(c) **Sight feeders.** Shorebirds tend to be attracted to disposal sites and placement activities due to the presence of food items in the dredged material. The impact of these operations at the open-water on sight feeders is expected to be a beneficial, short-term impact.

(4) **Actions taken to minimize impacts.** No special activities are anticipated to be required to minimize impacts on biota. Material will be placed as a thin layer to promote quick recovery of benthic species.

(5) **Contaminant determination.** No significant effects. As indicated in section 2.c.(2)(c) of this evaluation concerning toxic metals and organics. The results indicated no significant contamination in the sediment or overlying water.

d. **Aquatic Ecosystem and Organism Determinations.**

(1) **Effects on plankton.** Impacts from entrainment into the dredge and because of potential turbidity during dredging are anticipated to be minor and temporary because plankton are widely dispersed throughout the area. No detrimental long-term impacts to populations are expected.

(2) **Effects on benthos.** There would be temporary disruption of the aquatic community. Non-motile benthic fauna within the project area will be lost due to the proposed operations, but should repopulate within several months after dredging completion. Some of the motile benthic and pelagic fauna, such as crabs, shrimp, and fishes are able to avoid the disturbed area and should return shortly after the activity is completed. Larval and juvenile stages of these forms may not be able to avoid the activity due to limited mobility. The overall impact to these organisms is expected to be temporary and insignificant.

(3) **Effects on nekton.** Any dredging conducted during cold weather months may entrain and destroy sluggish benthic nekton juveniles and adults. Although benthic nekton may be destroyed during cold weather months, no significant impacts to benthic nekton populations are expected because the areas proposed for dredging are not known to be exclusive areas of high

concentrations of individuals of any species. During warm weather months, juvenile and adult benthic nekton should readily be able to avoid entrainment and destruction. Nekton would be able to return to borrow areas immediately following dredging.

(4) **Effects on aquatic food web.** The aquatic food web is anticipated to be temporarily impacted to a minor degree by dredging activities. Destruction of benthos will temporarily detrimentally impact the aquatic food web for a period of months to years until benthos recolonize the borrow site. Following recovery of food resources, no long-term impact to the aquatic food web is expected. No significant effects.

(5) **Effects on special aquatic sites.** No seagrass or oyster reefs are found within the project area.

(a) **Sanctuaries and refuges.** Not applicable to this area.

(b) **Wetlands.** No wetlands would be impacted during the proposed activity.

(c) **Mud flats.** No significant effects.

(d) **Vegetated shallows.** No significant effects.

(e) **Coral reefs.** Not applicable to this area.

(f) **Riffle and pool complexes.** Not applicable to this area.

(6) **Threatened and Endangered Species.** Under Section 7 coordination of the Endangered Species Act and the Marine Mammal Protection Act, the U.S. Army Corps of Engineers (USACE), Norfolk District, requested concurrence from the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) on the proposed threatened and endangered species in the project vicinity. On April 2, 1993, the NMFS issued a Biological Opinion (BO) for the borrow area dredging and transport to Sandbridge Beach. Recent coordination with the NMFS on December 2007, concluded that the current ITS and BO remain valid for the upcoming dredging and beach nourishment operations provided Norfolk District adheres to all reasonable and prudent measures and terms and conditions as outlined in the 2001 ITS and 1993 BO. The NMFS concluded that the proposed project was likely to adversely affect sea turtles, but not likely to jeopardize the continued existence of the species.

In April 2001, the USFWS issued a letter stating that the proposed project is not likely adversely affect sea turtles and in 2002, the USFWS agreed to the Corps' request to monitor for sea turtles only on the sections undergoing beach nourishment, rather than monitor the entire Virginia Beach shoreline. Additionally, the USFWS issued letter dated, October, 10, 2008 stating if the previously mentioned protective measures are followed, the proposed action is not likely to adversely affect Federally listed or proposed species or their critical habitat.

(7) **Other wildlife.** No significant effects.

(8) **Actions to minimize impact.** To prevent entrainment of sea turtles in the dredge, each dredge will be equipped with a turtle excluder device operated in manner approved by NMFS the for this purpose.

e. **Proposed Disposal Site Determinations.**

(1) **Mixing zone determinations.** Coarse grained-sand will rapidly settle to the bottom both at the dredging site(s) and at the placement site. Depth considerations are minimal since the receiving area is a beach; current velocities will remain essentially unchanged.

(2) **Determination of compliance with applicable water quality standards.** Dredging activities will be conducted in accordance with practices utilized in adjacent state waters. Transport of dredged material will comply with state water quality standards. State water quality certification will be obtained and all conditions of that certification will be followed.

(3) **Potential effects on human use characteristics.**

(a) **Municipal and private water supply.** Not applicable.

(c) **Recreational and commercial fisheries.** Minor short-term negative impact to commercial and recreational fishery anticipated during dredging and following loss of benthos. Benthic fauna on shoals are expected to recover within several months to several years following dredging. No long-term impacts to fisheries are expected.

(c) **Water-related recreation.** No significant effects.

(d) **Aesthetics.** Aesthetics will be modified temporarily by the physical presence of the dredge during borrow activities and there will be a short term negative effect on the beach's appearance while the placement of the material on the beach takes place due to the presence of the pipe and related equipment. No significant long-term effects.

(e) **Parks, national and historic monuments, national seashores, wilderness areas, research sites, and similar preserves.** No effects.

f. **Determination of Cumulative Effects on the Aquatic Ecosystem.** All data and information presented suggests the dredged material placement area would have no significant cumulative adverse effects on the aquatic ecosystem.

g. **Determination of Secondary Effects on the Aquatic Ecosystem.** No significant secondary effects on the aquatic ecosystem are expected.

3. **FINDING OF COMPLIANCE:**

a. Adaptation of the Section 404(b)(1) Guidelines to This Evaluation - No significant adaptation to the guidelines was made relative to this evaluation.

b. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impact on the Aquatic Ecosystem - Beach nourishment at Sandbridge was chosen as an alternative because of the demonstrated need to provide shoreline protection.

c. Compliance with Applicable State Water Quality Standards- The proposed action would not violate any applicable state water quality standards. Water quality certification will be received prior to construction. As required by the Coastal Zone Management Act, Coastal Zone Management Program of Virginia, the proposed project has been evaluated for consistency with the coastal development policies.

d. Compliance with Applicable Toxic Effluent Standard or Prohibition Under Section 307 of the Clean Water Act. - The proposed action would not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

e. Compliance with Endangered Species Act of 1973 - The project will not significantly detrimentally impact any endangered species or its critical habitat, and is therefore in compliance with the Endangered Species Act of 1973. To avoid detrimental impacts the needs of endangered species, mitigation measures will be utilized dredging to minimize the risk of entraining and destroying sea turtles. These measures include outfitting dredges with sea-turtle deflectors, conducting dredging operations in a manner to minimize risk of sea turtle entrainment, crew training, and the use of NMFS-approved observers, when applicable.

f. Compliance with Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act of 1972 - No Marine Sanctuaries, as designated in the Marine Protection, Research, and Sanctuaries Act of 1972, are located within the study area.

g. Evaluation of Extent of Degradation of Waters of the United States - The proposed dredging will result in adverse impacts to benthic invertebrates at the site, although not to regional populations. The proposed project would not have significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish and shellfish, wildlife, and special aquatic sites. The life stages of aquatic life and wildlife will not be significantly adversely affected. No significant adverse impacts on aquatic ecosystem diversity, productivity and stability, and recreation, aesthetics and economic values will occur as a result of the project.

h. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem - Appropriate steps will be taken to minimize potential adverse impacts of placing the fill material in the aquatic system. Proposed dredging guidelines and constraints were developed to minimize long-term adverse aquatic impacts, and best management practices will be utilized during dredging to minimize adverse environmental impacts.

i. On the basis of the guidelines, the proposed activities are specified as complying with the requirement of these guidelines with the inclusion of appropriate and practical conditions to minimize adverse effects to the aquatic ecosystem.

DATE____________________ ________________________________

Colonel, Corps of Engineers
District Engineer

Appendices

<u>Appendix A</u> - Biological Opinion (1993) and Incidental Take Statement (2001)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1335 East-West Highway
Silver Spring, MD 20910
THE DIRECTOR

APR 02 1993

Mr. Robert V. Ogle, P.E.
Chief, Planning Division
Department of the Army
Norfolk District
U.S. Army Corps of Engineers
Fort Norfolk, 803 Front Street
Norfolk, Virginia 23510-3097

Dear Mr. Ogle:

This is in response to your request for a formal consultation regarding borrow area dredging and transportation to the disposal site on Sandbridge Beach, Virginia Beach, Virginia. The enclosed biological opinion finds that biennial hopper dredging of the borrow area and transport to the disposal site during the period between May and November may adversely affect endangered Kemp's ridley and green sea turtles, fin and humpback whales, and threatened loggerhead sea turtles. However, the best available information indicates that this activity will not jeopardize the continued existence of these species.

The enclosed incidental take statement, pursuant to section 7 (b)(4) of the Endangered Species Act, authorizes the incidental taking of listed species while specifying the measures necessary to minimize the impact of dredging on sea turtles. The annual take level, by injury or mortality, authorized for this project is one documented Kemp's ridley or green sea turtle, or eight loggerhead sea turtles.

Consultation must be reinitiated if: (1) The amount or extent of taking specified in the incidental take statement is exceeded; (2) new information reveals impacts of the project that may affect listed species in a manner or to an extent not considered, thus far, in our opinions; (3) the identified activities are modified in a manner that causes an adverse effect to listed species not previously considered; or (4) a new species is listed, or critical habitat is designated that may be affected by the project.

The biological opinion also includes conservation recommendations. These recommendations should be seriously considered as measures to minimize impacts on sea turtles and

THE ASSISTANT ADMINISTRATOR
FOR FISHERIES

humpback whales, and are intended to assist the U.S. Army Corps of Engineers in promoting the conservation and recovery of listed species.

I look forward to your continued cooperation in future consultations.

Sincerely,

Nancy Foster

Nancy Foster, Ph.D.
Acting Assistant Administrator
for Fisheries

Enclosure

Biological Opinion (1993)

Endangered Species Act - Section 7 Consultation

Biological Opinion

Agency: U.S. Army Corps of Engineers
Norfolk District

Activity: Consultation in accordance with Section 7(a) of the Endangered Species Act regarding dredging by hopper dredge and transport to the disposal area at Sandbridge Beach in Virginia Beach, Virginia.

Consultation conducted by: National Marine Fisheries Service
Northeast Region

Date Issued: 4/2/93

Background

The National Marine Fisheries Service (NMFS), in their March 3, 1992, comments on the Draft Feasibility Report and Environmental Assessment of the Beach Erosion Control and Hurricane Protection for Sandbridge Beach, Virginia Beach, Virginia, and additional comments submitted June 4, 1992, discussed the potential impacts of hopper dredges on threatened and endangered species that may occur in the borrow area. Listed species that may occur in the area were identified as threatened loggerhead (Caretta caretta) turtles and endangered Kemp's ridley (Lepidochelys kempi), green (Chelonia mydas) and leatherback (Dermochelys coriacea) turtles, as well as fin (Balaenoptera physalus), humpback (Megaptera novaengliae) and right (Eubalaena glacialis) whales. Consultation with NMFS pursuant to section 7 of the Endangered Species Act of 1972 (ESA), as amended, was recommended. The U.S. Army Corps of Engineers (COE), Norfolk District, initiated informal consultation regarding dredging at the borrow area and transport of material to the disposal site area at Sandbridge Beach in the city of Virginia Beach, Virginia, in a letter dated May 7, 1992. Formal consultation was initiated with the submission of an ESA action plan on September 30, 1992, and a brief biological assessment on December 17, 1992. COE is conducting an informal consultation with the U.S. Fish and Wildlife Service for the disposal of dredged material on Sandbridge Beach.

Proposed Activities

This description of the project area and proposed activities are taken from the Final Feasibility Report and Environmental

Assessment of the Beach Erosion Control and Hurricane Protection for Sandbridge Beach, Virginia Beach, Virginia (USACOE, 1992(a)), and the Biological Assessment (USACOE (b)).

The proposed project includes the dredging of 972,000 cys of sand, as well as an additional 500,000 cubic yards every 2 years, from a borrow area off Virginia Beach, Virginia, in 27 to 45 feet of water approximately 3 miles offshore, 12 miles south of Cape Henry. Dredging would likely be conducted with a hopper dredge. The hopper dredge will be used to transport the sand to the disposal area, Sandbridge Beach, which extends from approximately 12 to 17 miles south of Cape Charles. The sand will be used to create a beach 50-feet wide at an elevation of 6 National Geodetic Vertical Datum (NGVD) with an oceanward slope of 1 foot on 20 feet for the 5-mile segment to reduce flood damage and erosion.

Listed Species Likely to Occur in the Project Area

Listed species under the jurisdiction of NMFS that occur in the project area and may be affected by the proposed activities include:

Endangered

Kemp's ridley turtle	- Lepidochelys kempi
leatherback turtle	- Dermochelys coriacea
hawksbill turtle	- Eretmochelys imbricata
green turtle	- Chelonia mydas
humpback whale	- Megaptera novaeangliae
fin whale	- Balaenoptera physalus
right whale	- Eubalaena glacialis

Threatened

loggerhead turtle	- Caretta caretta

Green turtles in U.S. waters are listed as threatened except for the Florida breeding population which is listed as endangered. Due to the inability to distinguish between these populations away from the nesting beach, green turtles are considered endangered whenever they occur in U.S. waters.

Biology and Distribution

Kemp's ridley turtle (Lepidochelys kempi)

Of the seven extant species of sea turtles of the world, the Kemp's ridley is in the greatest danger of extinction. The only major nesting area for this species is a single stretch of beach near Rancho Nuevo, Tamaulipas, Mexico (Carr 1963; Hildebrand, 1963). Virtually the entire world population of adult females nest annually in this single locality (Pritchard, 1969). When nesting aggregations at Rancho Nuevo were discovered in 1947, adult female populations were estimated to be in excess of 40,000 individuals (Hildebrand, 1963). By the early 1970s, the world population estimate of mature female Kemp's ridleys had been reduced to 2,500-5,000 individuals. The most recent estimate of the total population of sexually mature female Kemp's ridleys, based on total number of nests and the average number of nests per female per year, is approximately 490 turtles (Pritchard 1990; Byles, pers comm, 1991).

Nothing is known about the movements of hatchling Kemp's ridley turtles, although it is believed that they may be controlled by current patterns--either the loop current for northward transport or an eddy for southward transport with occasional transportation through the Florida Straits via the Gulf Stream system (Hildebrand, 1982). Juvenile Kemp's ridley turtles are known to occur in eastern U.S. coastal waters from Florida to Canadian portions of the Gulf of Maine (Lazell, 1980). Pritchard and Marquez (1973) suggest that passive transportation via the Gulf Stream up the eastern coast of the United States may be the usual dispersal pattern of young Kemp's ridley turtles. They speculate that turtles feed and grow rapidly during passive transport, and by the time they reach offshore waters of New England are large enough for active swimming. Morreale et al. (1992), however, hypothesize that passive drifting would result in only sporadic occurrence of ridleys in the northeast United States and that the observed annual occurrence suggests some alternative mechanism. Regardless of the mechanism, Kemp's ridley turtles enter northeastern coastal embayments when water temperatures approach 20°C (Burke et al., 1989, Musick et al., 1984) and become benthic feeders. Sea turtles leave the northern embayments in the fall, when water temperatures cool (Burke et al., 1991). Morreale et al., (1992) gives evidence for directed movements of Kemp's ridleys south, out of northeastern coastal waters, as temperatures drop below 14°C, generally in late October (Morreale, pers comm, 1992). Keinath et al., (1987) observe sea turtle emigration from the Chesapeake Bay when waters drop below 18°C in November.

Adult and juvenile Kemp's ridley turtles feed primarily in shallow coastal waters on bottom-living crustaceans (Hildebrand, 1982). Organisms identified from stomachs include crabs (Polyonchus, Hepatus, Callinectes, Panopeus, Mineppe, Ovalipes, Calappa, Portunus, Arenaeus, Limulus, Libinia, Cancer), fish (Lutjanus, Leiostomus), and mollusks (Noculana, Corbula, Mulinia, Nassarius) (Bellmund et al., 1987, Burke et al., 1990(a) and (b), Dobie et al., 1961; Pritchard and Marquez, 1973). All of these genera are forms common in the Gulf of Mexico and along the eastern coast of the United States.

Workers in the Chesapeake Bay area have indicated that Kemp's ridleys feed primarily on blue crabs in that embayment, and frequently occur in waters less then 5-meters (m) deep over grass beds such as those found in the Mobjack Bay, just north of the York River Entrance Channel (Lutcavage, 1981; Musick _et al_., 1984; Keinath _et al_., 1987; Byles, 1988).

Kemp's ridleys and loggerheads are apparently segregated by prey items and habitat preference in the Chesapeake Bay (Lutcavage, 1981; Keinath _et al_., 1987; Byles, 1988). Similar segregation is not seen in other northeast embayments such as the Delaware Bay (Eggers, 1989) and the Long Island Sound (Burke _et al_, 1990 (a)). Offshore distribution and habitat use of Kemp's ridleys is unknown due to their small size and cryptic coloring. Despite the spatial differences in range that may exist in some inshore waters, due to their more general overlapping inshore distribution, Kemp's ridleys are assumed to occur in offshore waters known to be utilized by loggerheads (Figure 1).

Leatherback turtle (_Dermochelys coriacea_)

The leatherback turtle is found throughout the waters of the Atlantic, Pacific, Caribbean, and the Gulf of Mexico (Ernst and Barbour, 1972). Leatherbacks are distributed pelagically and feed primarily on jellyfish such as _Stomolophus_, _Chryaora_, and _Aurelia_ (Rebel, 1974). They may come into shallow waters if there is an abundance of jellyfish nearshore. Nesting of the leatherback is almost entirely in tropical waters. In the eastern Caribbean nesting occurs in the Dominican Republic and on islands near Puerto Rico.

Shoop and Kenney (1992), observed leatherbacks during summer months scattered along the continental shelf from Cape Hatteras to Nova Scotia. Relative concentrations of leatherbacks were seen off the south shore of Long Island and off New Jersey. Leatherbacks in these waters are thought to be following their preferred prey--jellyfish including _Cyanea sp_ (Lazell, 1980; Shoop and Kenney, 1992).

Workers in the Chesapeake have observed leatherbacks in the mouth of the Bay during summer months (Byles, 1988). Since leatherbacks are not benthic feeders it is unlikely that they would be affected by dredging, although transit of the barge to and from the disposal area may increase the risk of vessel collision.

Hawksbill turtle (_Eretmochelys imbricata_)

The hawksbill turtle is relatively uncommon in the waters of the continental United States. Hawksbills prefer coral reefs, such as those found in the Caribbean and Central America. However, there are accounts of hawksbills in south Florida and a surprising number are encountered in Texas. Most of the Texas records are small turtles, probably in the 1-2 year class range. Many of these captures or strandings are of individuals in an unhealthy or injured condition (Hildebrand, 1982). The lack of sponge-covered reefs and the cold winters in the northern Gulf of Mexico, probably prevent hawksbills from establishing a viable population in this area.

Hawksbills feed primarily on a wide variety of sponges but also consume bryozoans, coelenterates, and mollusks. Nesting areas in the western North Atlantic include Puerto Rico and the Virgin Islands.

In the Atlantic, small hawksbills have stranded as far north as Cape Cod, Massachusetts (STSSN database, 1990). Many of these strandings have been observed after hurricanes or offshore storms. Although there have been no reports of hawksbills in the Chesapeake Bay, one has been observed taken incidentally in a fishery just south of the Bay (Anonymous, 1992). It is unlikely that hawksbills would be affected by the proposed project.

Green turtle (Chelonia mydas)

Green turtles are distributed circumglobally mainly in waters between the northern and southern 20° C isotherms (Hirth, 1971). In the western Atlantic, several major nesting assemblages have been identified and studied (Peters, 1954; Carr and Ogren, 1960; Duellman, 1961; Parsons, 1962; Pritchard, 1969; Carr et al., 1978). However, most green turtle nesting in the continental United States occurs on the Atlantic coast of Florida (Ehrhart, 1979). Only one nest has been reported on the Florida panhandle (Schroeder, pers comm).

While nesting activity is obviously important in determining population distributions, the remaining portion of the green turtle's life is spent on the foraging grounds. Some of the principal feeding pastures in the western Atlantic Ocean include the upper west coast of Florida, northwestern coast of the Yucatan peninsula, the south coast of Cuba, the Mosquito Coast of Nicaragua, the Caribbean coast of Panama, scattered areas along Colombia, and scattered areas off the Brazilian coast (Hirth, 1971). The preferred food sources in these areas are: Cymodocea, Thalassia, Zostera, Sagittaria and Vallisneria (Babcock, 1937; Underwood, 1951; Carr, 1954; Carr, 1952; Mexico, 1966).

Although no green turtle foraging areas or major nesting beaches have been identified on the Atlantic coast, evidence provided by Mendonca and Ehrhart (1982) indicates that immature green turtles may utilize lagoonal systems during periods of their lives. These authors identified a population of young green turtles (carapace length 29.5 - 75.4 cm) believed to be resident in the Mosquito Lagoon, Florida. The Indian River system, of which Mosquito Lagoon is a part, supported a green turtle fishery during the late 1800s (Ehrhart, 1983), and these turtles may be remnants of this historical colony. Additional juvenile green turtles occur north to the Long Island Sound, presumably foraging in coastal embayments. In North Carolina, green turtles are known from estuarine and oceanic waters. Recently, green turtle nesting has occurred on Bald Head Island, just east of the mouth of the Cape Fear River, on Onslow Island, and on Cape Hatteras National Seashore. No information is available regarding the occurrence of green turtles in the Chesapeake Bay, although they are presumably present in very low numbers.

Loggerhead turtle (_Caretta caretta_)

The threatened loggerhead is the most abundant species of sea turtle occurring in U.S. waters. Like Kemp's ridleys, they commonly occur throughout the inner continental shelf from Florida through Cape Cod, Massachusetts. Aerial surveys of loggerhead turtles at sea north of Cape Hatteras indicate that they are most common in waters from 22 to 49 m deep, although they occur from the beach to waters of 4,481 m (Shoop and Kenney, 1992). They enter northeast coastal embayments when water temperatures approach 20°C (Burke _et al._, 1989, Musick _et al._, 1984) to feed on benthic invertebrates. Loggerheads leave the northern embayments in the fall when water temperatures drop. Keinath _et al._, (1987) observed sea turtle emigration from the Chesapeake Bay when water temperatures cool to below 18°C, generally in November.

The preferred prey of the loggerhead turtle include mollusks, crustaceans, and sponges (Mortimer, 1982). Crabs and conchs were identified (Carr, 1952) as the most frequently found items in stomachs, although loggerheads often eat fish, clams, oysters, sponges, and jellyfish. Ernst and Barbour (1972) included marine grasses and seaweeds, mussels, borers, squid, shrimp, amphipods, crabs, barnacles, and sea urchins among the foods of loggerhead turtles. The horseshoe crab (_Limulus polyphemus_) has been identified as a major food source of loggerheads in Mosquito Lagoon, Florida, and the Chesapeake Bay (Mortimer, 1982; Keinath _et al._, 1987), however spider crabs (_Libinia sp._) and rock crabs (_Cancer irroratus_) have been determined as the primary components of the loggerhead diet in the Long Island Sound (Burke _et al._, 1990(a).

In the Chesapeake Bay, loggerheads are found commonly from May through October, with peak numbers observed in June (Lutcavage, 1981) in water depths of 4 to 20 m (Musick _et al._, 1984). Mark-recapture studies have shown that loggerheads in the Bay exhibit strong foraging site fidelity within and between seasons (Musick _et al._, 1984; Byles, 1988). Shoop and Kenney (1992) observed loggerheads along the coast and out to the continental shelf edge off Chesapeake Bay from the spring through the fall, peaking in summer months (June 21 to September 20) during their aerial surveys of northeastern continental shelf waters (Figure 1). Loggerheads were observed in water depths of 0 to 4,481 m, although most commonly in depths of 22 to 49 m. There is no information regarding the activity of these offshore turtles. They may be travelling to and from inshore foraging habitats, or may be feeding on resources available in the water column. The latter behavior is unquantified, although there are documented takes of loggerheads on longline hooks fishing in the water column with squid (NMFS, unpublished data), indicating that they are certainly willing to feed while in the pelagic environment. There is no information regarding the depths beyond which loggerheads will not feed on the bottom.

Right whale (Eubalaena glacialis)

The right whale population in the western North Atlantic is severely depleted and is estimated to include only 300 and 350 individuals (NMFS, 1992 **RTW Rec. Plan**). They feed primarily on copepods, but also consume euphausiids and other zooplankton. Calves are produced in winter off the coast of the Southeastern United States. Adult females calve every 3 to 5 years. Sexual maturity is reached as early as the 5th year and as late as age 9 (Knowlton and Kraus, 1989). The animal's size at this stage is from 30-40 feet in length.

This species was decimated during the 1700s by commercial whaling fleets; it was the preferred target species because right whales floated and were easily captured and butchered. Shore whaling was conducted off Massachusetts, New York, New Jersey, North Carolina, and Florida beaches. Present populations of right whales are estimated to be only 1-4 percent of the initial populations.

Right whales are present in foraging areas such as Cape Cod Bay, the Great South Channel, the mouth of the Bay of Fundy, and Brown's Bank (NMFS, 1992) in the spring and summer months. Although recent satellite tracking efforts have identified individual animals embarking on far ranging foraging episodes not previously known (Knowlton, pers comm). During the winter, a portion of the population moves from the summer foraging grounds to the calving/breeding grounds off Florida, Georgia, and South Carolina. The winter location of the bulk of the population is unknown.

During the winter in 1992, right whales were reported in North Carolina waters, north of Cape Hatteras (Knowlton, pers comm, 1992). They have not been documented in the project area, although could pass through when migrating feeding and breeding areas.

Humpback Whale (<u>Megaptera</u> <u>novaeangliae</u>)

Humpback whales occur in waters under U.S. jurisdiction throughout the year. Migrations occur annually between their summer and winter ranges. The summer range for the Western North Atlantic stock includes the Gulf of Maine, Canadian Maritimes, western Greenland, and the Denmark Strait. All humpback whales feed while on the summer range. The estimated population size is 5,505 (95 percent confidence interval, 2799 to 8211) (Katona and Beard, 1990) for the western North Atlantic region.

The winter range includes the Lesser Antilles, the Virgin Islands, Puerto Rico, and the Dominican Republic (NMFS, 1991). In general, it is believed that calving and copulation take place on the winter range. Calves are born from December through March and are about 4 m at birth. Sexually mature females give birth approximately every 2 to 3 years. Sexual maturity is reached between 4 and 6 years of age for females and between 7 and 15 years of age for males. Size at maturity is about 12 m. Humpback whales were commercially hunted from the 17th century into the 20th century. At least 9,125 humpback whales were killed within the North Atlantic Ocean west of Iceland between 1850 and 1971 (Mitchell and Reeves, 1983).

Until recently, humpback whales in the mid-Atlantic were considered transients. Few were seen during aerial surveys conducted over a decade ago (Shoop <u>et</u> <u>al</u>, 1982). However, since 1989, sightings of feeding juvenile humpbacks have increased along the coast of Virginia, peaking during the months of January through March in 1991 and 1992 (Swingle <u>et</u> <u>al</u>, 1993). Studies conducted by the Virginia Marine Science Museum (VMSM) indicate that these whales are feeding on, among other things, bay anchovies and menhaden. The VMSM study area is just north of the project area. The lack of sightings south of their study area is a function of vessel effort due to the proximity to the docks, not true whale distribution.

In concert with the increase in whale sightings, strandings of humpback whales have increased in the mid-Atlantic during this time, with 32 strandings between New Jersey and Florida since January 1989. Sixty percent of those that were closely investigated showed signs of entanglement or vessel collision (Wiley <u>et</u> <u>al</u>, 1993).

Fin Whale (<u>Balaenoptera</u> <u>physalus</u>)

While the fin whale is considered one of the more abundant large whale species, with a worldwide population estimate of 120,000. However, only a few thousand are believed to exist in the North Atlantic (Gambell, 1985). During the summer, in the western North Atlantic, fin whales can be found along the North

American coast to the Arctic and around Greenland. The wintering areas extend from the ice edge southward to the Caribbean and Gulf of Mexico.

Fin whales in the North Atlantic feed on herring, cod, mackerel, pollack, sardine, and capelin, as well as squid, euphausiids, and copepods. The peak months for breeding are December and January in the Northern Hemisphere. A single calf averaging about 6 m in length is produced after a gestation period of a little more than 11 months. Fully mature females may reproduce every 2 to 3 years. In the Northern Hemisphere females become sexually mature at a length of 18.3 m and the males at 17.7 m. Although fin whales are sometimes found singly or in pairs, they commonly form larger groups of 3 to 20 which may in turn coalesce into a broadly spread concentration of a hundred or more individuals, especially on the feeding grounds (Gambell, 1985). The fin whale was a prime target for commercial whaling after the Norwegian development of the explosive harpoon in 1864. North Atlantic stocks were heavily fished and because these stocks were relatively small, they were quickly depleted.

Fin whales were often spotted in mid-Atlantic waters, although nearshore occurrences in Virginia waters were undocumented. Some fin whales were seen off the Delmarva peninsula during aerial surveys conducted over a decade ago (Shoop et al, 1982). However, since 1989, sightings of feeding juvenile fin whales have increased along the coast of Virginia in the same area as the humpback whales (Swingle, pers comm). Fin whales are more difficult to study due to their speed, however, they are believed to be feeding with the humpbacks, on bay anchovies and menhaden.

Assessment of Impacts

The assessment is based on a review of the July 1992 Final Detailed Project Report and Environmental Assessment for the Navigation study of the Sandbridge Beach Erosion control and Hurricane Protection, Virginia Beach, Virginia (USACOE, 1992), the 1988 section 7 formal consultation conducted on maintenance dredging of the Cape Canaveral shipping channel (NMFS, SER, 1988), and the literature cited in the bibliography.

Sea Turtles

Hopper dredges are known to lethally take sea turtles in channels in which the turtles occur (NMFS, SER, 1988). In their report entitled "Decline of the sea turtles: Causes and prevention," the National Research Counsel's Committee on Sea Turtle Conservation estimated that dredging mortalities, along with boat hits, were second only to fishery interactions as a source of probable lethal takes of sea turtles. At least 178 sea turtle takes were observed on monitored dredges in the Cape

Canaveral and King's Bay entrance channels between 1980 and 1991 (Dickerson et al., 1991). Eighty-nine percent of these observed takes were lethal. Turtles pulled into the dragheads are forced through the pumps and crushed. Observers attempt to identify remains, which are generally small sections of viscera, bones, shell, or other materials that are deposited in the hopper with the dredged bottom materials. Screens on collection baskets and skimmers, as well as in areas of lateral overflow, collect neutrally buoyant particles which are monitored by the observer (Slay and Richardson, 1988). While some sea turtle takes can be documented through these observations, NMFS believes that most cannot be detected (NMFS, SER, 1988).

Most of the loggerhead and Kemp's ridley sea turtles in the Chesapeake Bay are juveniles and subadults. Loss of subadult sea turtles may be especially detrimental to the recovery of populations. Crouse et al., (1987) attempted to explain the decline of loggerhead nesting females. Applying a Leftovitch stage-class matrix model of loggerhead populations on Little Cumberland Island, Georgia, these authors showed that loggerhead population stability is more sensitive to changes in the subadult stage of development than in other developmental stages. Similar sensitivities may exist for Kemp's ridley turtles and other species.

Sea turtle studies conducted by the Virginia Institute of Marine Science (VIMS) incorporated aerial surveys, mark/recapture programs and radio/sonic/satellite telemetry. These studies indicate turtles enter the Chesapeake Bay when water temperatures approach 20°C, generally in late May, and remain foraging in the Bay until declining water temperatures force emigration, in November of most years (e.g., Lutcavage, 1981).

Little is known about the migratory routes chosen by loggerhead, Kemp's ridley, and green turtles entering the Chesapeake Bay. Sea turtles presumably winter in warmer waters further south and/or in the Gulf stream. A nearshore route from southern waters through warming shallow coastal waters could bring the turtles through the offshore borrow area. Alternatively, eddies of the Gulf stream could be followed, allowing a more perpendicular approach to the Bay from deeper offshore waters.

Emigration out of the Bay in October and November may also take sea turtles through the project area. One Kemp's ridley radio tagged and tracked in November 1980, travelled in an east-southeasterly direction offshore from the Bay mouth (Byles, 1988). Two loggerheads tagged with radio transmitters and one with a satellite transmitter were tracked from the Bay mouth in 1984 and 1985. These turtles travelled south alongshore initially, although one of these turtles headed into warmer Gulf Stream waters once off North Carolina and then headed north.

Initial nearshore movements may be due to short-term reactions to handling and tagging, or alternatively, may take advantage of the southerly longshore current.

These data make it difficult to predict the extent of the potential for take of sea turtles by hopper dredges during dredging operations at the offshore borrow area off Sandbridge Beach, Virginia Beach, Virginia. Turtles apparently occur in waters adjacent to the area throughout the summer and early fall. From May through June, when water temperatures are at or near 20°C, and late September through mid-November when temperatures drop, juvenile sea turtles on their way to or from the Chesapeake Bay may occur in the project area. During June through August, nesting females may occur in the area. Although there are very few nests on Virginia shores, Sandbridge Beach has been the site of a number of those reported (Byles and Musick, 1981). Bellmund et al. (1987), and Lutcavage (1981), report some strandings of loggerhead, Kemp's ridley, and leatherback turtles on beaches in or adjacent to the project area throughout the summer months, although there is clearly a peak in May and June.

Passage through the project area would not result in the take of sea turtles unless they were foraging along the bottom at the borrow area. Waters in the borrow area range from 8 to 13.5 m deep. In the Long Island Sound, Kemp's ridleys are generally observed diving to depths of approximately 6 to 10 m, even when swimming through deeper waters (Morreale and Standora, 1990). Kemp's ridleys travelling through deeper waters showed significantly longer surface times and more directed movements. Loggerheads, however, show significantly greater number of dives when in deep waters, although depths of dives are not as well known (Morreale pers comm, 1993). In the Chesapeake Bay, Kemp's ridleys are generally found in waters less then 5 m deep, and loggerheads in waters 4 to 20 m in depths. There is no information regarding whether benthic feeding occurs in waters between the inshore foraging habitats or whether some sea turtles remain outside of the productive embayments.

Green turtles are not present in detectable numbers in the Chesapeake Bay, but their presence in waters north and south of the Bay justify their inclusion in any incidental take allowance. Leatherbacks also may be in the area, but are not likely to be taken by the dredge.

Whales

Right whales have not been documented in the Virginia Beach area. It is not likely that they would be affected by the project. Humpback and fin whales occur in the coastal waters of Virginia from January through March, and may be in the project area or in waters immediately adjacent to them. Whales would not be directly affected by dredging operations; however, transit of vessels to and from the disposal site could result in vessel collisions.

Cumulative Effects

"Cumulative effects" are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation. State regulated fishing activities, including pound net, trawl, and gill net fisheries in the Chesapeake Bay take endangered and threatened sea turtles. These takes are not regulated or reported. It is expected that Virginia will continue to license/permit large vessel and thrill-craft operations which do not fall under the purview of a Federal agency. Increased recreational vessel activity in the Bay will likely increase the number of turtles taken by injury or mortality in vessel collisions.

Conclusion

The biennial dredging at the borrow area off of Sandbridge Beach, Virginia Beach, Virginia, by hopper dredge may impact threatened loggerhead sea turtles. Endangered Kemp's ridley or green turtles, or humpback or fin whales also may be affected, however, use of the project area by these species appears to be infrequent. NMFS concludes that the project as proposed, in conjunction with the above cumulative impacts, is not likely to jeopardize the continued existence of listed species under NMFS jurisdiction.

The following factors form the basis for this conclusion:

(1) There is no information regarding migration routes for sea turtles into and out of the Chesapeake Bay. However, although there is insufficient information in the Final Feasibility Report to determine the availability of prey species at the borrow area, there is no obvious bottom characteristic that would be expected to concentrate prey and foraging turtles at the site.

(2) Whales in inshore waters of Virginia are confined to water depths comparable to one-body length. As a result of this, if whales are in the project area, they should be sufficiently evident at or near the surface to be avoided by the dredge.

Reinitiation of Consultation

Reinitiation of formal consultation is required if (1) the amount or extent of taking specified in the incidental take statement is exceeded, (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered, (3) the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in the biological opinion, or (4) a new species is listed, or critical habitat designated that may be affected by the identified action.

Conservation Recommendations

Section 7 (a)(1) of the ESA, directs Federal agencies to utilize their authorities to promote the conservation and recovery of endangered and threatened species. The following conservation recommendations identify actions that COE can take to assist in the reduction of any potential adverse impacts to loggerhead, green, and Kemp's ridley sea turtles, as well as humpback and fin whales, that may result from dredging of the borrow area off Sandbridge Beach, Virginia Beach, Virginia.

(1) COE, in conjunction with their permittee, should confer with local institutions that monitor whale distribution in Virginia Coastal waters (such as the Virginia Marine Science Museum) to determine whether whales are known to occur in the vicinity of the project area. If whales may be present, vessels transiting the area should post a watch for whales, and avoid intentional approaches closer than 100 yards when in transit and reduce speeds to below 4 knots.

(2) The Final Feasibility Report indicates that a pipeline dredge with booster pumps may be used, however, the hopper dredge in summer months is preferred due to better weather conditions and more controlled sand placement on the beach. Coe should continue to investigate the possibility of using another dredge type, such as a clamshell dredge, for this project.

(3) If it is determined that a hopper dredge must be used, dredging between mid-May and mid-November should be avoided, as much as possible.

(4) COE should conduct or support additional investigations into the migration routes of sea turtles into and out of the Chesapeake Bay.

(5) The ESA section on 7 consultation regarding the impacts of all planned hopper dredging in the Chesapeake Bay and Virginia coastal waters on listed species should be continued.

(6) The Norfolk District should support or participate in the Waterways Experiment Station's (WES) investigations into modifications of dredges to reduce sea turtle takes and

improve methods of monitoring sea turtle takes in hoppers and removing sea turtles from the borrow area prior to dredging. Investigations should consider any and all possible engineering solutions to the problem.

(7) The Norfolk District should coordinate with other COE districts in the northeast United States to present a workshop to train dredge/disposal observers in the Northeast Region. Training should be conducted by a NMFS-approved observer or an approved training program.

(8) Aerial surveys of the area may be used to identify the presence of sea turtles in waters near the borrow area prior to deployment of an onboard observer. If aerial surveys conducted by experienced personnel do not reveal the presence of sea turtles, and water temperatures are below 20°C, deployment can be delayed until those conditions change or until June 1, whichever comes first.

(9) The Norfolk District should work with WES to develop a protocol for testing and evaluating new draghead designs and/or deflector devices. At some point in the evaluation process, it will be necessary to test the effectiveness of such devices in areas where sea turtles are present. COE is responsible for ensuring that applicable permits for scientific research and/or incidental taking are obtained.

Scientific research permits and/or incidental take permits issued under section 10(a) of the ESA may be necessary to conduct research on sea turtles or dragheads.

Incidental Take Statement

Section 7 (b)(4) of the ESA provides for the issuance of an incidental take statement on the agency action if the biological opinion concludes that the action is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical habitat. In such a situation, NMFS will issue an incidental take statement specifying the impact of any incidental taking of endangered or threatened species, providing for reasonable and prudent measures that are necessary to minimize impacts, and setting forth the terms and conditions with which the action agency must comply in order to implement the reasonable and prudent measures. Incidental takings resulting from the agency action, including incidental takings caused by activities authorized by the agency, are authorized under the incidental take statement only if those takings are in compliance with the specified terms and conditions.

Because of seasonal observations of sea turtles in the mid-Atlantic and at the mouth of the Chesapeake Bay and documentation of lethal takes of sea turtles in hopper dredges deployed in areas where sea turtles occur, NMFS anticipates that the proposed dredging at the borrow area off Sandbridge Beach, Virginia Beach, Virginia, may result in the injury or mortality of loggerhead, Kemp's ridley, and green turtles. Therefore, we have established an appropriate low level of incidental take and terms and conditions necessary to minimize and monitor the impact to each species. An incidental take level, by injury or mortality, of one documented Kemp's ridley or green turtle, or eight loggerhead turtles is set pursuant to section 7 (b)(4) of the ESA. If the incidental take meets or exceeds this level, COE must reinitiate consultation. The NMFS Northeast Region will cooperate with COE in the review of the project to determine the need for developing further mitigation measures or terminating the remaining dredging activity.

The following terms and conditions are established to implement the reasonable and prudent measures necessary to minimize the impact of dredging the borrow area off Sandbridge Beach, Virginia Beach, Virginia, by hopper dredge and to document incidental take, should such take occur.

1. COE must explain annually, in writing, to the Regional Director, why a hopper dredge, rather than a clamshell or other dredge less likely to impact sea turtles, must be employed at the Sandbridge borrow area between May 15 and November 30 of any year.

2. NMFS-approved observers are required on hopper dredges once surface waters reach 20°C (or May 15, whichever comes first) through November 30 of any year to monitor the hopper spoil, overflow, screening, and dragheads for sea turtles and their remains. These observers must be aboard the dredges for a minimum of 25-percent coverage. Coverage may be increased if the incidental take limit is approached. Weekly summary reports must be submitted to NMFS' Northeast Region by the observers for review.

3. The hopper dredge must be equipped with screening or baskets to better monitor the intake and overflow of the dredged materials for sea turtles and their remains. These screens should sample at least 70 percent of the overflow area and should be installed at the applicable area (i.e., the "skimmer funnels" and the starboard and port sides of the vessels, etc). Every effort should be made to effectively sample the turtle parts which travel through the hopper and exit in the overflow material. New approaches to sampling for turtles parts should be investigated, if possible.

4. A report summarizing the results of the dredging and the sea turtle take must be submitted to COE and NMFS within 15-working days of completion of the project.

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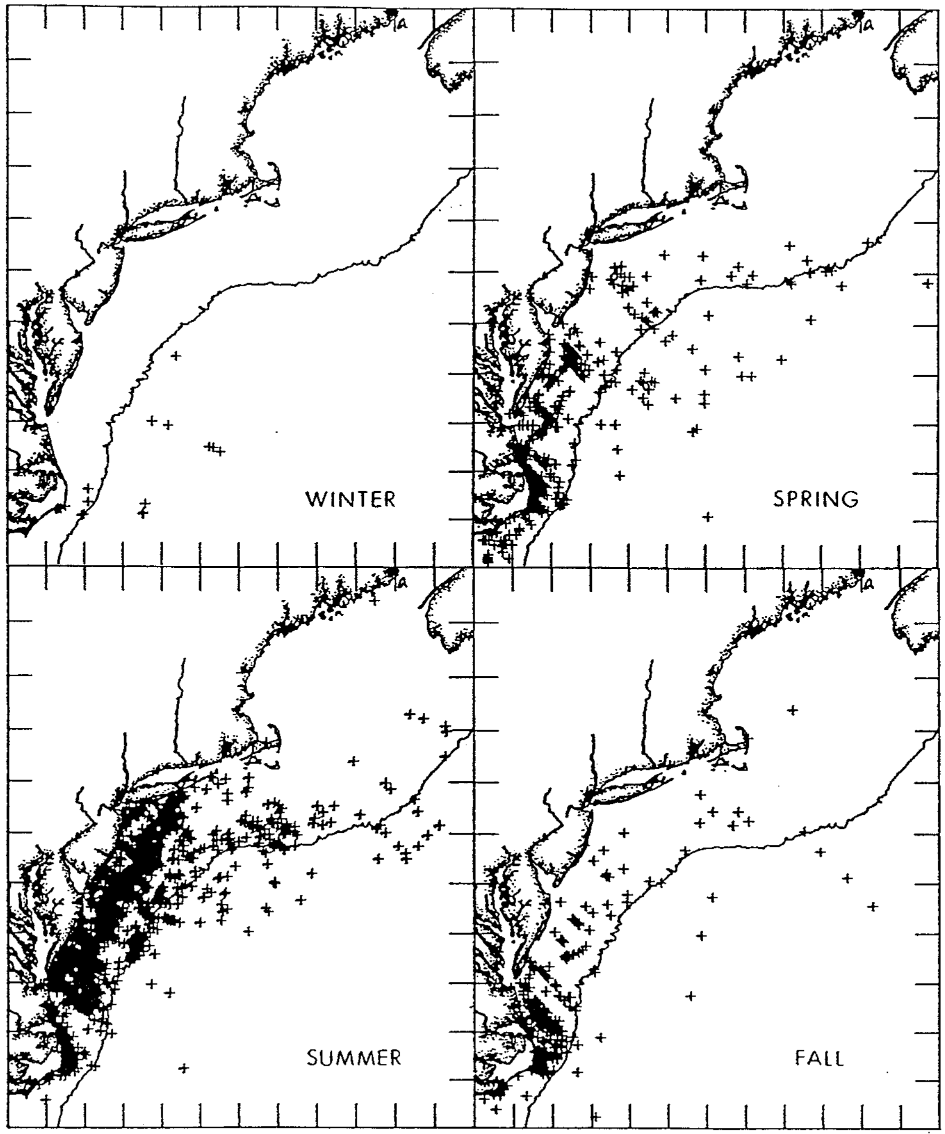


Figure 1: Seasonal plots of loggerhead sea turtle sightings within the CETAP study area.

From: Figure 6, Shoop, C.R. and R. D. Kenney. 1992. Seasonal distributions and abundance of loggerhead and leatherback sea turtles in waters of the northeastern United States. Herpetological Monographs, 6. 1992. 43-67

Incidental Take Statement (2001)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
One Blackburn Drive
Gloucester, MA 01930-2298

2001

Mr. Mark T. Mansfield
Chief, Planning Branch
Environmental Analysis Team
Department of the Army
Norfolk District, Corps of Engineers
Fort Norfolk, 803 Front Street
Norfolk, VA 23510-1096

Dear Mr. Mansfield:

This responds to your June 11, 2001, letter regarding the Sandbridge Beach Erosion and Hurricane Protection Project in Virginia Beach, Virginia, and the potential need for a revised Incidental Take Statement (ITS) for endangered and threatened sea turtles found in the project area. The National Marine Fisheries Service (NMFS) issued a Biological Opinion (BO) for borrow area dredging and transport to the Sandbridge Beach disposal area on April 2, 1993. Due to funding delays, this nourishment project was not completed until the summer of 1998, at which time the reasonable and prudent measures and terms and conditions outlined in the 1993 BO were incorporated into the project specifications.

The upcoming project, scheduled to begin in the summer of 2002, incorporates the same design criteria as the 1998 project. Specifically, approximately 1.5 million cubic yards (cy) of material will be hopper dredged from a borrow area off Virginia Beach, in 27 to 45 feet of water approximately 3 miles offshore. While environmental conditions and funding may delay future nourishment projects, dredging is scheduled to be completed every two years with approximately 1.1 million cy to be dredged in future events. The dredged material will be transported to Sandbridge Beach to create a 50 foot wide berm at an elevation of 6 feet with an oceanward slope of 1 foot on 20 feet for a shoreline distance of approximately 5 miles. The purpose of this project is to reduce flood damage and erosion.

Reinitiation of section 7 consultation is required if: (1) the amount or extent of taking specified in the incidental take statement is exceeded; (2) new information reveals effects of these actions that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) project activities are subsequently modified in a manner that causes an effect to the listed species that was not considered in this BO; or (4) a new species is listed or critical habitat designated that may be affected by the identified actions. The original project analyzed in the 1993 BO involved dredging 972,000 cy of sand in the first year and an additional 500,000 cy every two years. The 1998 dredging and beach nourishment project involved a greater amount of material, and this same amount will also be dredged in 2002. While this is a variation to the original project description, the increase in the amount of material to be dredged will not change the conclusion reached in the 1993 BO. For instance, the previous BO assessed the effects of borrow area hopper dredging and transportation to the disposal site, and the impacts of these activities (e.g., entrainment and collisions with vessels) are the same as those expected for the proposed 2002 project. The upcoming Sandbridge Beach project will be dredging more material than described in the 1993 BO, but the modified project activities do not cause an effect to listed species that was not previously considered in the 1993 BO, nor do they change the original conclusion.

However, new information on sea turtle resuscitation, hopper dredge interactions and reporting requirements have arisen since 1993, and it is NMFS' opinion that the 1993 ITS should be revisited to adequately consider this new information. NMFS is able to issue an amendment to the 1993 BO to modify the ITS. The issuance of an entirely new BO is not warranted at this time, as the effects of the action on sea turtles described in the 1993 BO still pertain to the project in 2002 and in the future. The attachment to this letter will serve as the amendment to the BO and any future Sandbridge Beach Erosion and Hurricane Protection Projects incorporating the same dredging and disposal design criteria will be subject to these conditions.

Note that the revised anticipated take level is different than the incidental take amount designated in 1993. NMFS believes that a revision to the previous take levels is appropriate given the lack of observed takes during the 1998 dredging project, the anticipated take levels for similar projects in nearby locations, and the magnitude and location of the dredging in relation to turtle distribution in the project area during the summer. Thus, NMFS anticipates that up to five loggerheads or one Kemp's ridley or green sea turtle will be taken annually in actions related to the dredging and beach nourishment of Sandbridge Beach, Virginia, instead of the 1993 annual incidental take level of eight loggerhead turtles or one documented Kemp's ridley or green turtle.

The NMFS expects the Army Corps of Engineers (ACOE) to implement the reasonable and prudent measures and terms and conditions as outlined in the attached ITS. The measures of the ITS are non-discretionary and must be undertaken by the ACOE for the incidental take exemption to apply. For example, any incidental take of sea turtles must be reported to NMFS within 24 hours of the take and a final report summarizing the results of the dredging and all takes of listed species must be submitted to NMFS within 30 days of the completion of each cycle of the project.

The incidental take statement is applicable for the duration of the BO, or until reinitiation is warranted. It is not necessary to reinitiate consultation with NMFS if the Sandbridge Beach Erosion and Hurricane Protection Project scope and design criteria remain the same for future dredging activities (anticipated to be completed every two years). However, if project activities are modified in a manner that changes the impacts to listed species, consultation should be reinitiated.

I look forward to our continued cooperation to ensure the protection and conservation of sea turtles in Virginia waters. Please contact Carrie McDaniel of my staff at (978) 281-9388 if you have questions about these comments.

Sincerely,

Patricia A. Kurkul
Regional Administrator

Attachment

cc: Nichols
File Code: 1514-05 (A), ACOE – Sandbridge

INCIDENTAL TAKE STATEMENT

Section 9 of the Endangered Species Act (ESA) and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined to include any act which actually kills or injures fish or wildlife and includes significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the Army Corps of Engineers (ACOE) so that they become binding conditions for the exemption in section 7(o)(2) to apply. ACOE has a continuing duty to regulate the activity covered by this Incidental Take Statement. If ACOE (1) fails to assume and implement the terms and conditions or (2) fails to adhere to the terms and conditions of the Incidental Take Statement through enforceable terms, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, ACOE must report the progress of the action and its impact on the species to the National Marine Fisheries Service (NMFS) as specified in the Incidental Take Statement [50 CFR §402.14(i)(3)].

NMFS anticipates that the dredging at the borrow area off Sandbridge Beach, Virginia may result in the observed annual take of five loggerheads, or one Kemp's ridley or green sea turtle. While it is difficult to ascertain future take of sea turtles, given the previous level of take in dredging operations in the same general area, the distribution and number of sea turtles in the Chesapeake Bay, and the nature of the dredging, NMFS believes that the proposed action will not take over five loggerheads, or one Kemp's ridley or green sea turtle.

In the 1993 Biological Opinion, NMFS evaluated the effects of the take of eight loggerhead turtles or one documented Kemp's ridley or green turtle on the species populations. NMFS determined that these interactions, should they occur, are not likely to result in jeopardy to the species. This conclusion remains the same for this revised take level, as the loggerhead take levels have been decreased and the Kemp's ridley and green take levels remain the same.

Reasonable and Prudent Measures

NMFS has determined that the following reasonable and prudent measures are necessary and appropriate to minimize impacts of incidental take of sea turtles. Although no takes of other listed species are authorized at this time, these measures must be undertaken in a manner which ensures detection of takes of these other species so that appropriate reinitiation action can be taken.

1. From May 1 to November 30, hopper dredges shall be outfitted with state-of-the-art sea turtle deflectors on the draghead and operated in a manner that will reduce the risk of interactions with sea turtles, which may be present in the dredge area.

2. Dredges shall be equipped and operated in a manner that provides endangered/threatened species observers with a reasonable opportunity for detection interactions with listed species and that provides for handling, collection, and resuscitation of turtles injured during project activity. Full cooperation with the endangered/threatened species observer program is essential for compliance with the terms and conditions of this ITS.

3. ACOE must develop and follow a system to provide timely reporting to the NMFS on any takes of protected species.

4. Personnel onboard dredge vessels must follow specific instructions on proper sea turtle handling and resuscitation techniques.

Terms and Conditions

In order to be exempt from the prohibitions of Section 9 of the ESA, the ACOE must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. If dredging occurs between May 1 and November 30, hopper dredges must be equipped with the rigid deflector draghead as designed by the ACOE Waterways Experimental Station (WES), or if that is unavailable, a rigid sea turtle deflector attached to the draghead. Deflectors should be checked and/or adjusted by a designated expert prior to a dredge operation to insure proper installment and operation during dredging. The deflector should be checked after every load throughout the dredge operation to ensure that proper installation is maintained. Since operator skill is important to the effectiveness of the WES-developed draghead, operators must be properly instructed in its use.

2. If dredging occurs during the period of May 1 through November 30, the ACOE must adhere to the attached "Monitoring Specifications for Hopper Dredges" with trained NMFS-approved sea turtle observers, in accordance with the attached "Observer Protocol" and "Observer Requirements" (Appendix A). NMFS-approved observers will be required on hopper dredges during the period of May 1 through November 30 of any year to monitor the hopper spoil, overflow, screening and dragheads for sea turtles and their remains.

3. The Norfolk District ACOE shall ensure that all contracted personnel involved in operating hopper dredges receive thorough training on measures of dredge operation that will minimize takes of sea turtles. Training shall include measures discussed in Appendix A. It shall be the goal of each hopper dredging operation to establish operating procedures that are consistent with those that have been used during hopper dredging in other regions of the coastal United States, and which have proven effective in reducing turtle/dredge interactions.

4. It is unlikely that sea turtles will survive entrainment in a hopper dredge, as the turtles found in the dragheads are almost always dead, dying, or dismantled. However, a few turtles have escaped hopper dredges without apparent injuries. A sub-adult loggerhead was removed from dredge gear unharmed in Savannah, Georgia and an occasional small green turtle has been known to survive (Slay 1995, Magnuson et al. 1990). The procedures for handling live sea turtles are outlined in case the unlikely event should occur. All permit holders must follow the sea turtle handling techniques specified in Appendix A-II-E and Appendix`B.

5. A final report summarizing the results of the dredging and any takes of listed species must be submitted to the NMFS (at the address specified in Appendix A) within 30 working days of completion of each cycle of the project.

6. Vessels must comply with the ESA 500-yard approach regulations for right whales. To minimize risks from vessel operations around other listed species, the dredge vessel should not intentionally approach listed species closer than 100 yards when in transit. When species are present, vessels should, except when precluded by safety requirements, follow the advice of the onboard NMFS-approved observer to avoid collisions.

7. If listed species are present during dredging or material transport, vessels transiting the area should post a watch, avoid intentional approaches closer than 100 yards (or 500 yards in the case of right whales) when in transit, and reduce speeds to below 4 knots.

8. If the take of loggerhead sea turtles approaches 2/3 of the permitted incidental take level (i.e., 3 turtles) during any project cycle, the ACOE should immediately contact NMFS at (978) 281-9388 to review the situation and determine whether any new management measures should be implemented to prevent the total incidental take level from being reached.

NMFS anticipates that up to five loggerhead, or one Kemp's ridley or green sea turtles will be incidentally taken in any given year as a result of dredging and transport to Sandbridge Beach nourishment site. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might result from the proposed action. If, during the course of the project, this level of incidental take is exceeded, the additional level of take would represent new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided above.

APPENDIX A

MONITORING SPECIFICATIONS FOR HOPPER DREDGES

I. EQUIPMENT SPECIFICATIONS

A. Baskets or screening

Baskets or screening must be installed over the hopper inflows with openings no smaller than 4 inches by 4 inches to provide 100% coverage of all dredged material and shall remain in place during all dredging operations between May 1 and November 30 of any calendar year. Baskets/screening will allow for better monitoring by observers of the dredged material intake for sea turtles and their remains. The baskets or screening must be safely accessible to the observer and designed for efficient cleaning.

B. Draghead

The draghead of the dredge shall remain on the bottom **at all times** during a pumping operation, except when:

1) the dredge is not in a pumping operation, and the suction pumps are turned completely off;

2) the dredge is being re-oriented to the next dredge line during borrow activities; and

3) the vessel's safety is at risk (i.e., the dragarm is trailing too far under the ship's hull).

At initiation of dredging, the draghead shall be placed on the bottom during priming of the suction pump. If the draghead and/or dragarm become clogged during dredging activity, the pump shall be shut down, the dragarms raised, whereby the draghead and/or dragarm can be flushed out by trailing the dragarm along side the ship. If plugging conditions persist, the draghead shall be placed on deck, whereby sufficient numbers of water ports can be opened on the draghead to prevent future plugging.

Upon completion of a dredge track line, the drag tender shall:

1) throttle back on the RPMs of the suction pump engine to an idling speed (e.g., generally less than 100 RPMs) **prior to** raising the draghead off the bottom, so that no flow of material is coming through the pipe into the dredge hopper. Before the draghead is raised, the vacuum gauge on the pipe should read zero, so that no suction exists both in the dragarm and draghead, and no suction force exists that can impinge a turtle on the draghead grate;

2) hold the draghead firmly on the bottom with no flow conditions for approximately 10 to 15 seconds before raising the draghead; then, raise the draghead quickly off the bottom and up to a mid-water column level, to further reduce the potential for any adverse interaction with nearby turtles;

3) re-orient the dredge quickly to the next dredge line; and

4 re-position the draghead firmly on the bottom prior to bringing the dredge pump to normal pumping speed, and re-starting dredging activity.

C. Floodlights

Floodlights must be installed to allow the NMFS-approved observer to safely observe and monitor the baskets or screens.

D. Intervals between dredging

Sufficient time must be allotted between each dredging cycle for the NMFS-approved observer to inspect and thoroughly clean the baskets and screens for sea turtles and/or turtle parts and document the findings. Between each dredging cycle, the NMFS-approved observer should also examine and clean the dragheads and document the findings.

II. OBSERVER PROTOCOL

A. Basic Requirement

A NMFS-approved observer with demonstrated ability to identify sea turtle species must be placed aboard the dredge(s) being used; starting immediately upon project commencement to monitor for the presence of listed species and/or parts being entrained or present in the vicinity of dredge operations.

B. Duty Cycle

One NMFS-approved observer is to be onboard for the first week of dredging beginning May 1 and subsequent shifts would proceed one week on and one week off duty until project completion or November 30, whichever comes first. While onboard, observers shall provide the required inspection coverage on a rotating basis of six hours on and six hours off each day. Combined monitoring periods would then represent 50% of total dredging time through one dredging cycle with 25% of total dredging time having actually been monitored by observers. After the first cycle of dredging, ACOE may request that NMFS evaluate the observer data to determine if the same level of monitoring is necessary for the next cycle of dredging.

C. Inspection of Dredge Spoils

During the required inspection coverage, the trained NMFS-approved observer shall inspect the galvanized screens and baskets at the completion of each loading cycle for evidence of sea turtles. The Endangered Species Observation Form shall be completed for each loading cycle, whether listed species are present or not (Appendix C). If any whole turtles (alive or dead) or turtle parts are taken incidental to the project(s), Carrie McDaniel (978) 281-9388 or Mary Colligan (978) 281-9116 must be contacted within 24 hours of the take. An incident report for sea turtle take (Appendix D) should also be completed by the observer and sent to Carrie McDaniel via FAX (978) 281-9394 within 24 hours of the take. Every incidental take (alive or dead) should be photographed. Weekly reports, including all completed load sheets, photographs, and relevant incident reports, as well as a final report, are to be submitted to the attention of Carrie McDaniel, NMFS, Protected Resources Division, One Blackburn Drive, Gloucester, MA 01930-2298.

D. Information to be Collected

For each sighting of any endangered or threatened marine species (including whales as well as sea turtles), record the following information on the Endangered Species Observation Form (Appendix C):

1) Date, time, coordinates of vessel
2) Visibility, weather, sea state
3) Vector of sighting (distance, bearing)
4) Duration of sighting
5) Species and number of animals
6) Observed behaviors (feeding, diving, breaching, etc.)
7) Description of interaction with the operation

E. Disposition of Parts

If any whole turtles (alive or dead) or turtle parts are taken incidental to the project(s), Carrie McDaniel (978) 281-9388 or Mary Colligan (978) 281-9116 must be contacted within 24 hours of the take. All whole dead sea turtles or turtle parts should be photographed and described in detail on the Incident Report of Sea Turtle Mortality (Appendix D). The photographs and reports should be submitted to Carrie McDaniel, NMFS, Protected Resources Division, One Blackburn Drive, Gloucester, MA 01930-2298. Any dead **Kemp's ridley** sea turtles shall be photographed, placed in plastic bags, labeled with location, load number, date, and time taken, and placed in cold storage. Dead turtles or turtle parts will be further labeled as recent or old kills based on evidence such as fresh blood, odor, and length of time in water since death. Disposition of dead sea turtles will be determined by NMFS. Other sea turtle species (loggerhead, leatherback, or green turtles) taken either whole or in parts, should be disposed of (after a photograph is taken and a reporting form has been completed) by attaching a weight to the animal and dumping the specimen at the dredge spoil disposal site. If the species is unidentifiable or if there are entrails that may have come from a turtle, the subject should be photographed, placed in plastic bags, labeled with location, load number, date and time taken, and placed in cold storage. Dead Kemp's ridley or unidentifiable species or parts will be collected by NMFS or NMFS-approved personnel (contact Carrie McDaniel at (978) 281-9388).

Live turtles (both injured and uninjured) should be held onboard the dredge until transported as soon as possible to the appropriate stranding network personnel for rehabilitation (Appendix B). No live turtles should be released back into the water without first being checked by a qualified veterinarian or a rehabilitation facility. Virginia stranding network members (for rehabilitating turtles) include Mark Swingle and/or Susan Barco at the Virginia Marine Science Museum [(757)437-4949] and Jack Musick at the Virginia Institute of Marine Science [(804)684-7313]. Mark Swingle/Susan Barco and Dana Hartley (NMFS Stranding Network Coordinator: [(508) 495-2090]) should also be contacted immediately for any marine mammal injuries or mortalities.

III. OBSERVER REQUIREMENTS

Submission of resumes of endangered species observer candidates to NMFS for final approval ensures that the observers placed onboard the dredges are qualified to document takes of endangered and threatened species, to confirm that incidental take levels are not exceeded, and to provide expert advice on ways to avoid impacting endangered and threatened species. NMFS does not offer certificates of approval for observers, but approves observers on a case-by-case basis.

A. Qualifications

Observers must be able to:

1) differentiate between leatherback (*Dermochelys coriacea*), loggerhead *Caretta caretta*), Kemp's ridley *(Lepidochelys kempi*), green (*Chelonia mydas*), and hawksbill *(Eretmochelys imbricata*) turtles and their parts;

2) handle live sea turtles and resuscitate and release them according accepted procedures;

3) correctly measure the total length and width of live and whole dead sea turtle species;

4) observe and advise on the appropriate screening of the dredge's overflow, skimmer funnels, and dragheads; and

5) identify marine mammal species and behaviors.

B. Training

Ideally, the applicant will have educational background in marine biology, general experience aboard dredges, and hands-on field experience with the species of concern. For observer candidates who do not have sufficient experience or educational background to gain immediate approval as endangered species observers, we note below the observer training necessary to be considered admissible by NMFS. We can assist the ACOE by identifying groups or individuals capable of providing acceptable observer training. Therefore, at a minimum, observer training must include:

1) instruction on how to identify sea turtles and their parts;

2) instruction on appropriate screening on hopper dredges for the monitoring of sea turtles (whole or parts);

3) demonstration of the proper handling of live sea turtles incidentally captured during project operations. Observers may be required to resuscitate sea turtles according to accepted procedures prior to release;

4) instruction on standardized measurement methods for sea turtle lengths and widths; and

5) instruction on how to identify marine mammals; and

6) instruction on dredging operations and procedures, including safety precautions onboard a vessel.

APPENDIX B

Sea Turtle Handling and Resuscitation

It is unlikely that sea turtles will survive entrainment in a hopper dredge, as the turtles found in the dragheads are usually dead, dying, or dismantled. However, the procedures for handling live sea turtles follow in case the unlikely event should occur.

Please photograph all turtles (alive or dead) and turtle parts found during dredging activities and complete the Incident Report of Sea Turtle Take (Appendix D).

<u>Dead sea turtles</u>

The procedures for handling dead sea turtles and parts are described in Appendix A-II-E.

<u>Live sea turtles</u>

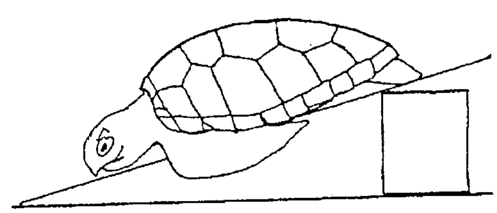
When a sea turtle is found in the dredge gear, observe it for activity and potential injuries.

- **If the turtle is actively moving**, it should be retained onboard until evaluated for injuries by a permitted rehabilitation facility. Due to the potential for internal injuries associated with hopper entrainment, it is necessary to transport the live turtle to the nearest rehabilitation facility as soon as possible, following these steps:
    1) Contact the nearest rehabilitation facility to inform them of the incident. If the rehabilitation personnel cannot be reached immediately, please contact Carrie McDaniel at (978) 281-9388 or Dana Hartley at (508) 495-2090.
    2) Keep the turtle shaded and moist (e.g., with a water-soaked towel over the eyes, carapace, and flippers).
    3) Contact the crew boat to pick up the turtle as soon as possible from the dredge (within 12 to 24 hours maximum). The crew boat should be aware of the potential for such an incident to occur and should develop an appropriate protocol for transporting live sea turtles.
    4) Transport the live turtle to the closest permitted rehabilitation facility able to handle such a case.

    Do not assume that an inactive turtle is dead. The onset of rigor mortis and/or rotting flesh are often the only definite indications that a turtle is dead. Releasing a comatose turtle into any amount of water will drown it, and a turtle may recover once its lungs have had a chance to drain.

- **If a turtle appears to be comatose** (unconscious), contact the designated stranding/rehabilitation personnel immediately. Once the rehabilitation personnel has been informed of the incident, attempts should be made to revive the turtle at once. Sea turtles have been known to revive up to 24 hours after resuscitation procedures have been followed (50 CFR 223.206(d)(1)).

    - Place the animal on its bottom shell (plastron) so that the turtle is right side up and elevate the hindquarters at least 6 inches for a period of 4 up to 24 hours. The degree of elevation



depends on the size of the turtle; greater elevations are required for larger turtles.

- Periodically, rock the turtle gently left to right and right to left by holding the outer edge of the shell (carapace) and lifting one side about 3 inches then alternate to the other side.
- Gently touch the eye and pinch the tail (reflex test) periodically to see if there is a response.
- Keep the turtle shaded and moist (e.g., with a water-soaked towel over the eyes, carapace, and flippers) and observe it for up to 24 hours. Do not place the turtle in a container holding water.
- If the turtle begins actively moving, retain the turtle on board until the appropriate rehabilitation personnel can evaluate the animal.
- Turtles that fail to respond to the reflex test and do not move within several hours (up to 24) must be handled in the manner described in Appendix A-II-E.

Stranding/rehabilitation contacts

- Virginia stranding network members (for rehabilitating turtles) include Mark Swingle and/or Susan Barco at the Virginia Marine Science Museum [(757)437-4949] and Jack Musick at the Virginia Institute of Marine Science [(804)684-7313].
- Mark Swingle/Susan Barco and Dana Hartley (NMFS Stranding Network Coordinator [(508) 495-2090]) should also be contacted immediately for any marine mammal injuries or mortalities.

APPENDIX C

ENDANGERED SPECIES OBSERVER FORM
Sandbridge Beach Dredging Project

Daily Report

Date: ______________________________

Geographic Site: ____

Location: Lat/Long ____________________ Vessel Name ____________________

Weather conditions: ____

Water temperature: Surface ________________ Below midwater (if known) ____________

Condition of screening apparatus: ____

____

____

Incidents involving endangered or threatened species? (Circle) Yes No
(If yes, fill out Incident Report of Sea Turtle Mortality)

Comments (type of material, biological specimens, unusual circumstances, etc:)

____

____

____

____

____

____

Observer's Name: ____

Observer's Signature: ____

BRIDGE WATCH SUMMARY

Species	# of Sightings	# of Animals	Comments

APPENDIX D

INCIDENT REPORT OF SEA TURTLE TAKE
Sandbridge Beach Dredging Project

Species ______________ Date ________________ Time (specimen found) ______________

Geographic Site ____
Location: Lat/Long ____
Vessel Name _________________________________ Load # ________________________
Begin load time _________________________ End load time _________________________
Begin dump time ________________________ End dump time ________________________

Sampling method ____
Condition of screening ____
Location where specimen recovered ____
____

Draghead deflector used? YES / NO Rigid deflector draghead? YES / NO
Condition of deflector ____

Weather conditions ____
____

Water temp: Surface __________________ Below midwater (if known) ___________________

Species Information: *(please designate cm/m or inches.)*

Head width __________________________ Plastron length ______________________________
Straight carapace length (or total length) ______________ Straight carapace width____________
Curved carapace length ___________________ Curved carapace width ____________________
Condition of specimen/description of animal (please complete attached diagram) ____________
____
____

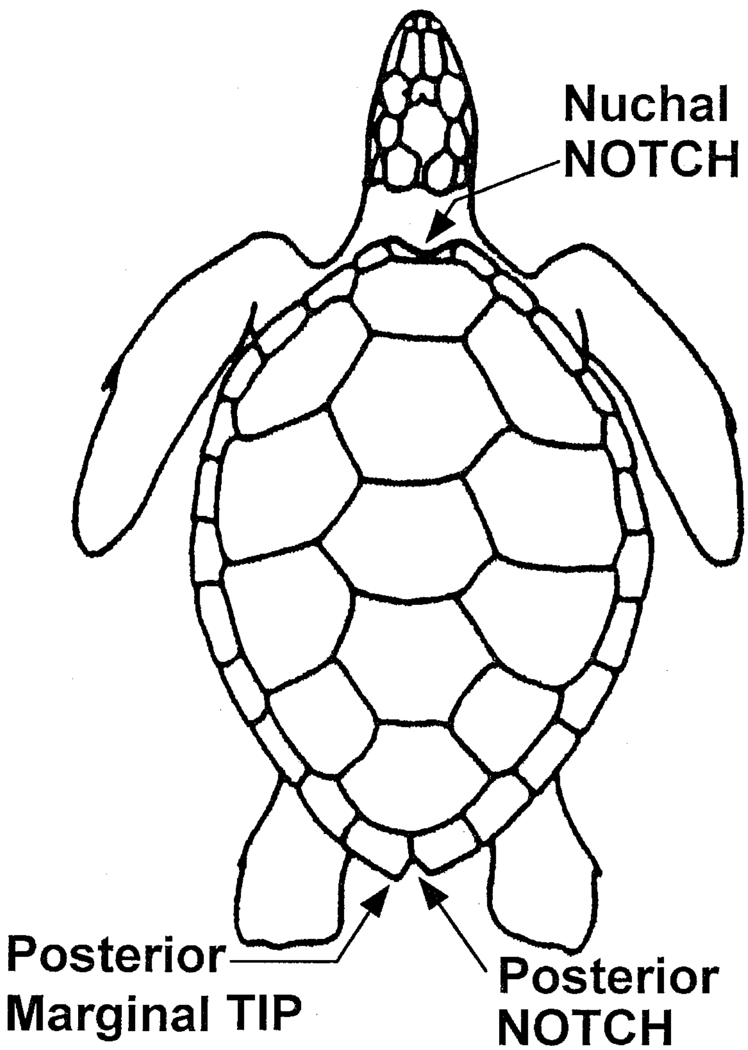
Turtle tagged: YES / NO *Please record all tag numbers.* Tag # ______________________
Photograph attached: YES / NO
(Please label *species, date, geographic site* and *vessel name* on back of photograph)

Comments/other (include justification on how species was identified) ____________________
____
____
____

Observer's Name ______________________________________
Observer's Signature ___________________________________

Incident Report of Sea Turtle Take – Sandbridge Beach Dredging Project

Draw wounds, abnormalities, tag locations on diagram and briefly describe below.



Description of animal:

<u>Appendix B</u> - Essential Fish Habitat Assessment

APPENDIX B

ESSENTIAL FISH HABITAT ASSESSMENT
SANDBRIDGE BEACH EROSION CONTROL
AND
HURRICANE PROTECTION PROJECT
VIRGINIA BEACH, VIRGINIA
Draft

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ESSENTIAL FISH HABITAT ASSESSMENT
SANDBRIDGE BEACH EROSION CONTROL
AND
HURRICANE PROTECTION PROJECT
VIRGINIA BEACH, VIRGINIA
Draft

I. Introduction and Background

Sandbridge Beach is located on a barrier island along coastal southeast Virginia separating the Atlantic Ocean on the east from Back Bay, a shallow freshwater sound, to the west. It is a residential community of mostly year round residents, rental properties, and summer homes located approximately 5 miles south of Virginia Beach's "resort strip." Several major storms, nor'easters, and hurricanes have struck the area in past years causing severe losses of sand and coastal flooding; the oceanfront is susceptible to wave attack on the beach berm and dunes. During the initial development of Sandbridge Beach as a residential community, sand dunes were lowered, bulldozed, and in some cases, removed for construction near the shoreline. Flooding in the winter of 1991 caused about $2 million in damages. In 1992, 166 oceanfront lots were fortified with bulkheads to control erosion; by 1996, storm damage left only 122 properties protected by bulkheads.

A Phase I Advanced Engineering and Design Study for Beach Erosion and Hurricane Protection at Virginia Beach, including Sandbridge Beach, was authorized by Section 1(a) of the Water Resources Development Act of 1974 (Public Law 93-251, 93rd Congress, H.R. 10203, 7 March 1974). In March 1992, the U.S. Army Corps of Engineers (USACE) completed a Final Feasibility Report and Environmental Assessment (EA) for Sandbridge Beach evaluating economic, engineering, and environmental concerns. The Minerals Management Service (MMS) prepared a supplemental EA in 1997, 2001, and 2006 to support the extraction and use of Outer Continental Shelf (OCS) sand in the project.

This Essential Fish Habitat (EFH) assessment was prepared by the USACE, acting as lead Federal agency, in cooperation with the MMS, to present the potential impacts that could result from beach nourishment of the oceanfront at Sandbridge Beach and the related offshore extraction of beach borrow material. The proposed maintenance project would begin in Spring/Summer 2010 and incorporate the same design criteria as previous projects.

The designated borrow site is Sandbridge Shoal, located approximately 3 nautical miles from the shoreline, outside of Virginia's territorial sea (Figure 1). Estimated sand reserves are 40 million cy (Hardaway et al., 1998). In places, the shoal is about 20 ft thick. The principal sediment is fine to medium sand. There are two designated borrow areas on Sandbridge Shoal, Area B to the north and Area A to the south; depths here range from 30 to 65 feet (~10-15 m in the areas actively being dredged). The region between the two borrow sites is a no-dredge zone due to the presence of a buried Navy submarine communications cable.

Approximately 6,810,000 cy of sand were removed from Sandbridge Shoal between 1996 and 2007 for use in beach nourishment and coastal restoration projects (Figure 2). Sandbridge Shoal was first used in 1996 when 810,000 cy were dredged from Area B for shoreline protection at

Dam Neck. Dam Neck was renourished a second time by the Navy in 2003 with 700,000 cy dredged from Area B. Beach nourishment for Sandbridge Beach actually began in 1998, using 1,100,000 cy from Area B. Sandbridge Beach was renourished again in 2002 with 2,000,000 cy dredged from Area B and 2,200,000 cy in 2007 dredged from areas A and B.

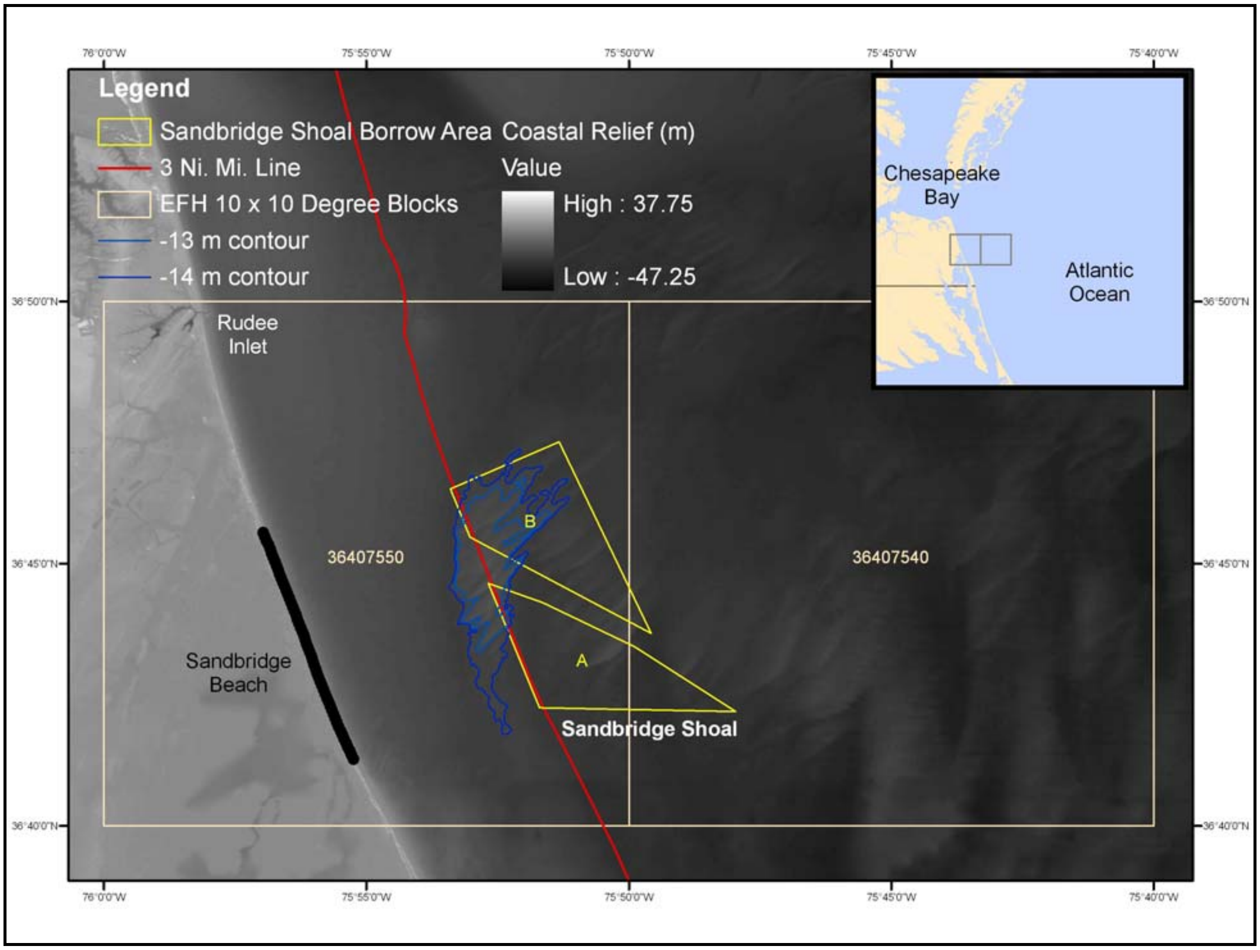


Figure 1: Location map of Sandbridge Shoal and Sandbridge Beach

II. Purpose

Provisions of the Magnuson-Stevens Fishery Conservation and Management Act (16 USC 1801) require that EFH areas be identified for each species managed under a fishery management plan, and that all Federal agencies consult with the National Marine Fisheries Service (NMFS) on all Federal actions that may adversely affect EFH. EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." The EFH areas have been designated by the Fishery Management Councils and were published in March 1999 by NMFS. This EFH assessment is being prepared pursuant to Section 305(b)(2) of the Magnuson-Stevens Act, and includes the following required parts: 1) identification of species of concern; 2) a description of the proposed action; 3) an analysis of the effects of the proposed action; 4) proposed mitigation; and 5) the Federal agency's views regarding the effects of the proposed action. The purpose of this consultation process is to address specific federal actions that may adversely affect EFH, but do not have the potential to cause substantial adverse impact.

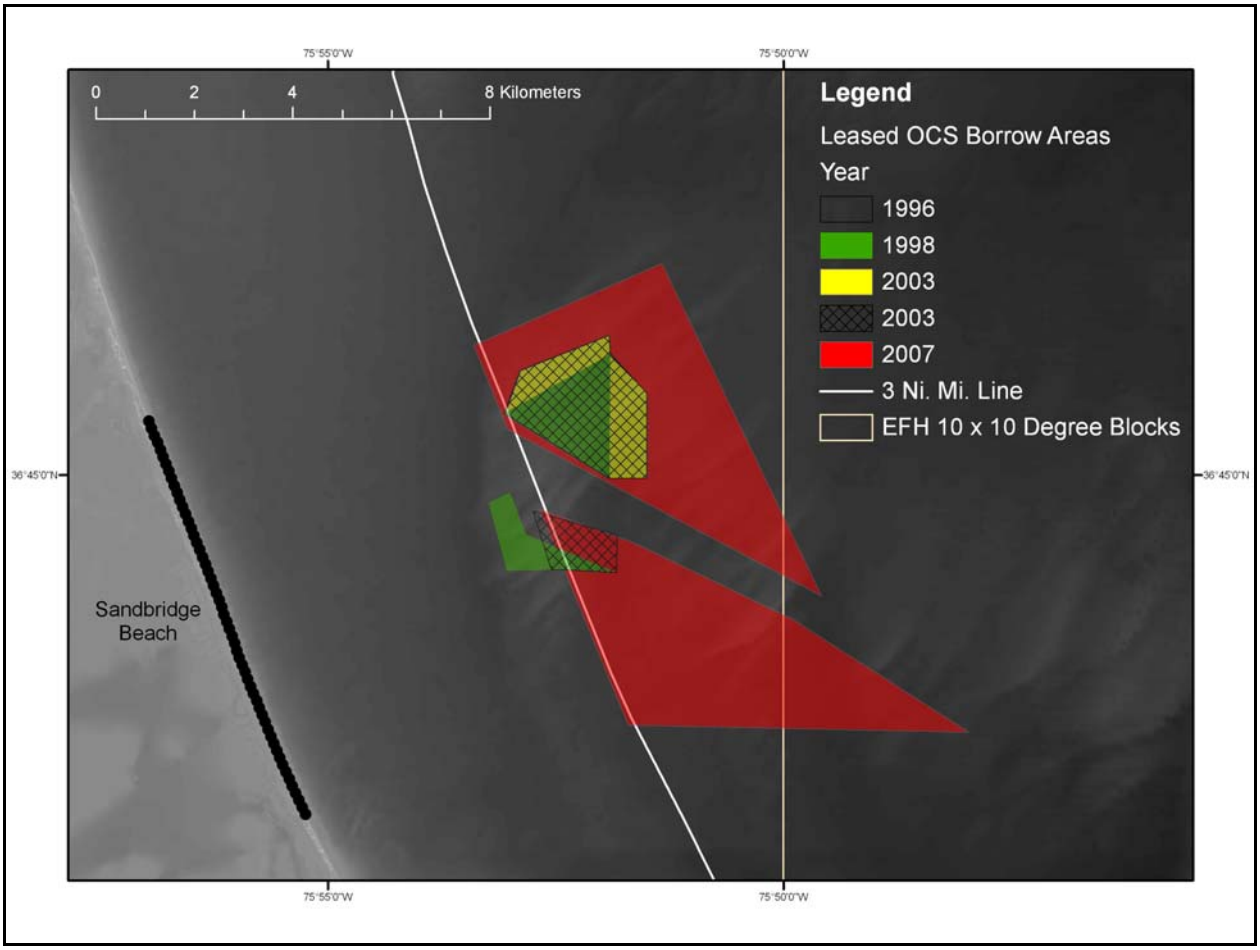


Figure 1: Location map showing borrow areas used since 1996 to obtain sand for beach nourishment projects at Sandbridge Beach and Dam Neck Naval Facility. Material was dredged from much smaller regions with each approved lease area.

III. Proposed Project

Approximately 1.5 to 2.0 million cubic yards (cy) of beach quality sand would be placed on the beach approximately every 3 years depending upon weather conditions, availability of funding, and behavior of subsequently placed material at the project site. The cycle may occur less often, but probably no less than once every 5 years. The specific beach area covered extends from the U.S. Naval Fleet Anti-Air Warfare Training Center at Dam Neck to the north to Back Bay National Wildlife Refuge to the south. The project dimensions include a 50-foot wide berm at an elevation of 6 feet North American Vertical Datum (NGVD) with a foreshore slope of approximately 1:20 (one vertical foot to 20 horizontal feet) for a distance of approximately 5 miles.

The designated borrow area for the planned spring/summer 2010 project is Borrow Area B; higher relief sand ridges on the crest of main shoal body are the primary target for dredging (Figure 3). Borrow Area A would still remain an option in the event it is deemed necessary to dredge in that location. Approximately 1.5 to 2.0 million cubic yards of beach quality sand would be removed by trailing suction hopper dredge. A hydraulic cutterhead suction dredge may be operated, but is highly unlikely; this type of dredge has not been previously utilized. The specifications for the project call for a duration of approximately 90-120 days.

A hopper dredge digs material from the bottom by making passes over the site, typically moving at 1 to 2 knots. The hopper dredge is equipped with dragarms, dragheads, and a hopper which collects and decants slurried sand. In the case of a twin-arm dredge, the material is dug in two swaths that are each the width of the draghead (typically 6-8 ft wide). To get a full load, a typical hopper dredge may make two or three passes along the target shoal. The dragheads house the pumping system, typically have teeth and pressure jets to loosen the material being dredged, and are fitted with turtle deflectors. When the hopper is full, material is transported to a pump out buoy located offshore. The material is then pumped through a discharge pipeline, which runs along the ocean floor, and up onto the beach where bulldozers and graders will distribute the material along the subaerial beach and foreshore. The project schedule would require either two medium-size hopper dredges (4,000-5,000 cubic yards capacity) delivering a total of six loads per day (three each), or one large hopper dredge (9,000 to 12,000 cy) delivering two or three loads per day.

A cutter-suction dredge uses a rotating cutterhead around the intake of a suction pipe to break up or loosen bottom material. The cutter-suction dredge is typically anchored in fixed position by a three-wire anchoring arrangement or spuds; the position is changed as the dredge finishes removing all the material it can reach. The dredge digs material from the bottom by swinging the cutterhead back and forth across an arc of 150 to 300 feet. Winches on the bow of the dredge pull the cutterhead back and forth and advance it ahead in the cut in 4- to 6-foot steps. A large centrifugal pump removes the loosened material from the ocean bottom and pumps it as a sediment-water slurry through a discharge pipeline to the placement site. But in cases where the distance from the dredge location to the placement site is beyond a few miles, the slurry is often pumped into scows for transport to the placement site. The dredge plant is supported by one or more small work boats used for surveying, line handling, anchor placement, and transporting workers. In the case of a barge-based project, operation would include one or two tugboats and one or two barges.

Historically, dredging and placement for the Sandbridge Beach project has occurred between the months of January and October. Future dredging could potentially occur during any month of the year, but substantial winter dredging would be unlikely because of hopper dredge availability, greater ocean wave energy and resultant higher risk to ships and crew, as well as difficulty of operation. Dredging and placement operations, conducted since 1996, have typically taken between 10-15 weeks to complete, but depend on the number of hopper dredges deployed.

IV. EFH Consultation History

Since EFH areas along coastal Virginia were first designated by the Mid-Atlantic Fishery Management Council and published by NOAA Fisheries in 1999, formal consultation was not initiated for initial construction at the Dam Neck Naval Facility in 1996 or Sandbridge Beach in 1998.

MMS submitted an EFH assessment in October 2001 to support leasing OCS sand from Sandbridge Shoal for the first maintenance cycle of the Corps' Sandbridge Beach Erosion Control and Hurricane Protection Project planned for 2002-2003. The assessment determined that 740 acres of EFH may experience adverse effects, with the most impact on demersal fishes. In January 2002, the Northeast Region of NOAA Fisheries offered conservation recommendations to mitigate potential impacts and monitor the extent of impacts and potential recovery of managed species and their associated habitat. The MMS responded in February 2002 indicating its intention to follow the specified measures to the maximum extent practicable. In June 2002, the MMS submitted an assessment addendum given that the timing of the proposed action had changed - the original assessment and addendum covered species present in both fall and spring. In August 2002, NOAA Fisheries determined that the assessment and addendum adequately addressed potential impacts on managed species and their habitat and found that no additional conservation recommendations were necessary.

In July 2003, the Navy submitted a new EFH assessment that considered the potential effects of using another 700,000 cubic yards of OCS sand from Sandbridge Shoal to replenish the Dam Neck Annex Beach. The assessment, addressing impacts of dredging over the fall and winter months, determined that the proposed project may have adverse effects on EFH for Federally managed species. In September 2003, Tim Goodger (NOAA Fisheries) emailed the Navy providing the identical conservation recommendations as provided to the MMS in 2002.

The MMS attempted to consult with NOAA Fisheries in 2006 for the second maintenance cycle of the Sandbridge Beach Erosion Control and Hurricane Protection Project planned for summer 2007, but did not receive any response to multiple phone or email communications.

Since new information about managed species and their associated habitat is available, the Corps and MMS have reinitiated consultation.

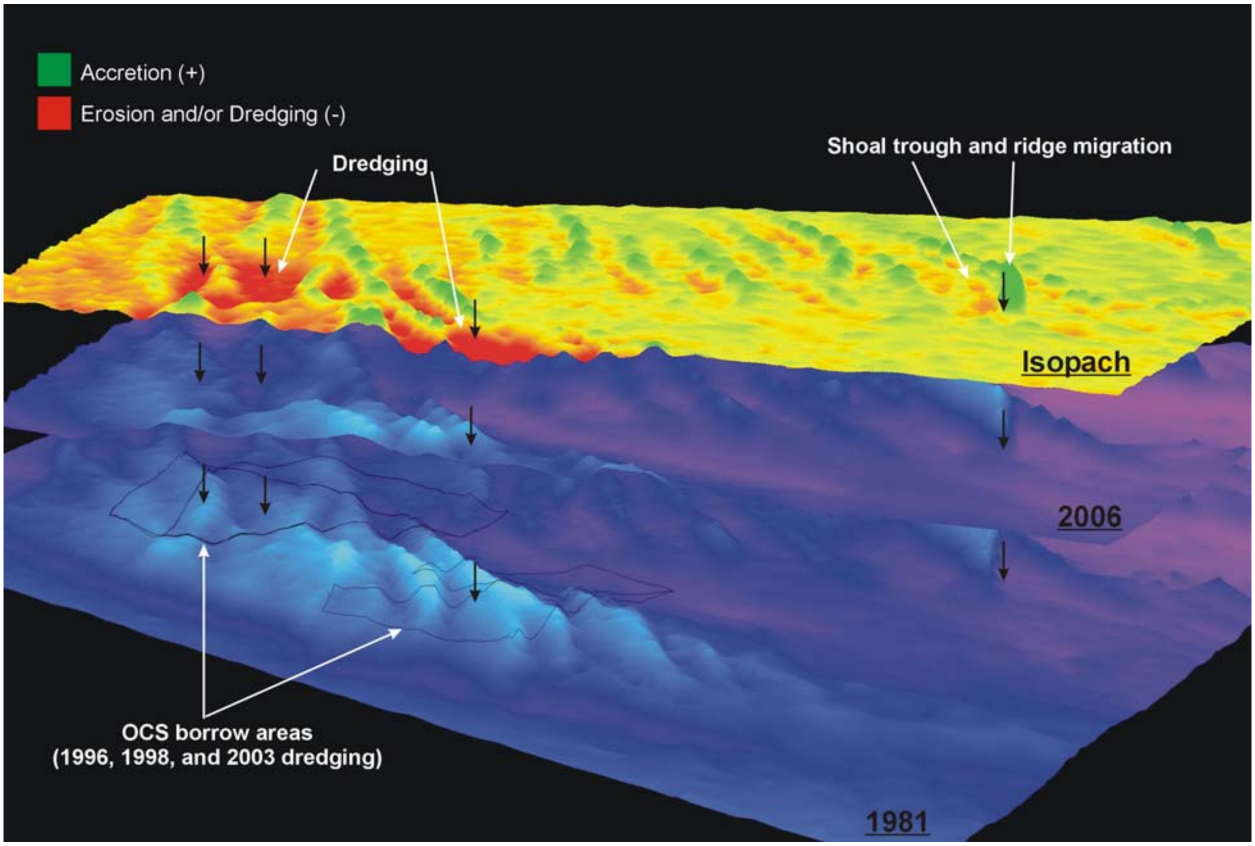


Figure 2: Bathymetric elevation models represent the seafloor in the vicinity of Sandbridge Shoal. The isopach shows the difference between the two surfaces and the physical evolution of the shoal complex during the 25 year intervening period.

V. Benthic Habitat and Biota Monitoring on Sandbridge Shoal

Physical processes dominate the sand-rich habitat of Sandbridge Shoal and the seaward series of high relief secondary shoals (Figure 3). The shoal environment is frequently exposed to high wave and current energy given its relatively shallow water depth. The seafloor of the main shoal body is characterized by fine to medium sands. Smooth-crested wave-orbital bedforms have been repeatedly documented in benthic video and stillshots (Cutter and Diaz, 1998; Diaz et al., 2003). The bottom substrate east of the shoal is increasingly silty sand and patchy, where biological activity tends to be higher.

Over decadal timeframes, the ridge and swale topography imprinted on the larger shoal body is actively migrating to the south-southwest under coupled wave-current forcing. Figure 3, which compares 1981 and 2006 bathymetric surfaces, shows three physical signatures: 1) the southward migration of trough and ridges (see as alternating bands of erosion and accretion); 2) trough deepening and ridge crest growth and steepening; and 3) localized, persistent effects of dredging along shoal flanks and crests in limited subregions of Areas A and B.

Figure 4 shows pre- and post-dredging conditions in 1998 and 2003 for a subregion of Area B, while Figure 5 shows pre- and post-dredging conditions in 2007 for a subregion of Area A. Two different dredging approaches are illustrated: (1) shallow dredging of multiple shoal ridges and (2) targeted extraction from a single shoal ridge. Some of the same shoal ridges have been dredged during more than one construction cycle, increasingly the likelihood and severity of impact. However, the shoal ridges typically targeted for dredging are large scale and high relief features. Consequently, they are not entirely eliminated during dredging. Although shoal relief and footprint are significantly reduced, the shoals are morphologically intact and continually shaped by the same physical processes. Between dredging episodes, the shoals show relatively little volumetric recovery, leading to a long-term reduction in the surface area of bottom habitat.

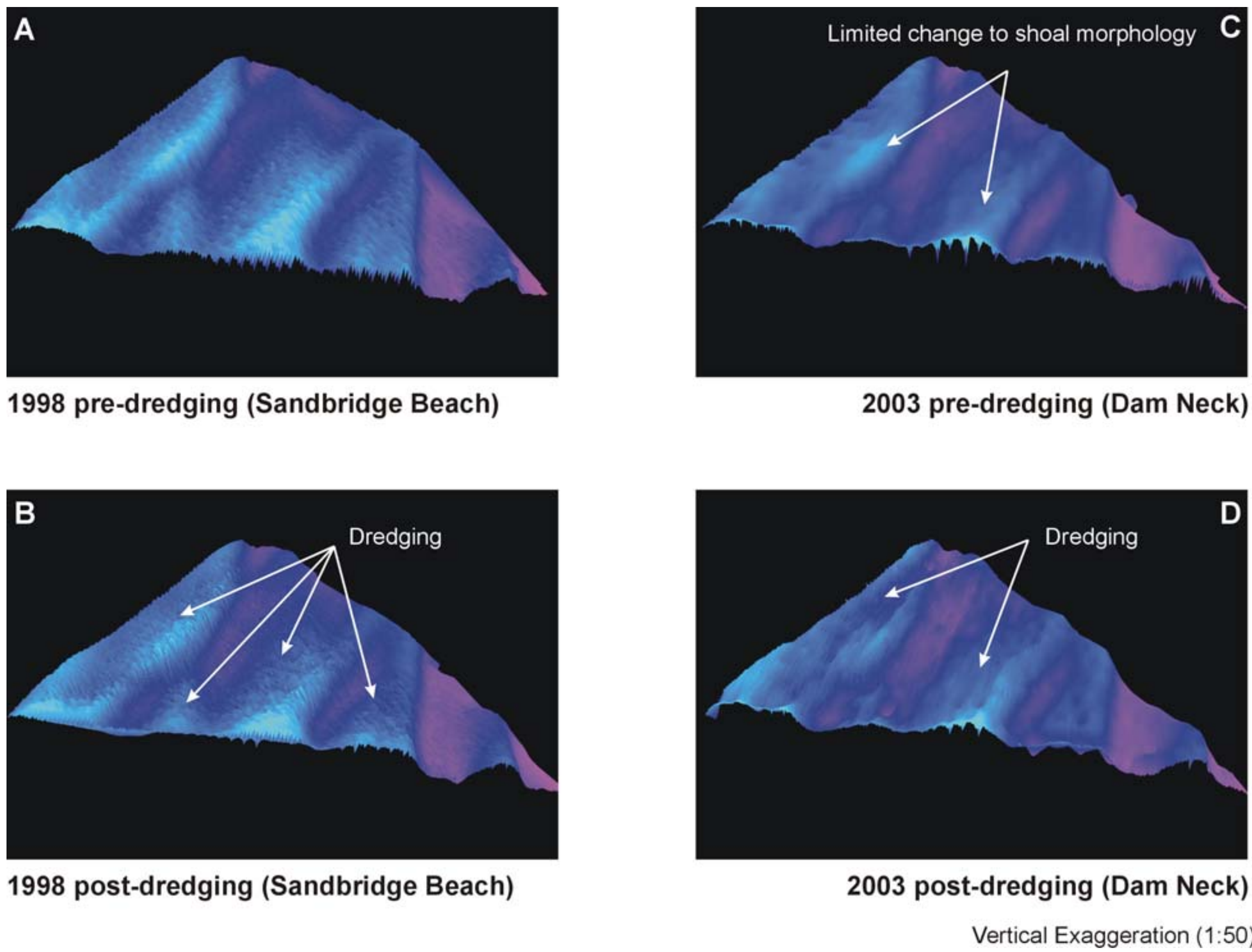


Figure 3: Pre- and post-dredging conditions in 1998 and 2003 for a subregion of Area B.

From 2002 to 2005, VIMS implemented a rigorous biological monitoring program that focused on possible biological impacts associated with dredging of Area B (Diaz et al., 2006). Results from that field campaign were compared to earlier benthic assessments (Cutter and Diaz, 1998). During survey periods in 2002, 2004, and 2005, physical processes were predominant in structuring sediment surfaces for all sampling stations in all years. Observations in 1996 and 1997 showed increasingly biologically dominated habitats with increasing distance off shoal (Cutter and Diaz, 1998). Diaz et al. (2006) have attributed some of the spatial and temporal heterogeneity to 1) energetic storms which expose and rework surface sediments, 2) infrequent, but significant benthic recruitment events, and 3) seasonal variability. Despite multiple dredging events, the shoal environment continues to host robust macrobenthic and fish communities. In the vicinity of historic dredging, no negative impacts for macrobenthos or demersal fishes were documented.

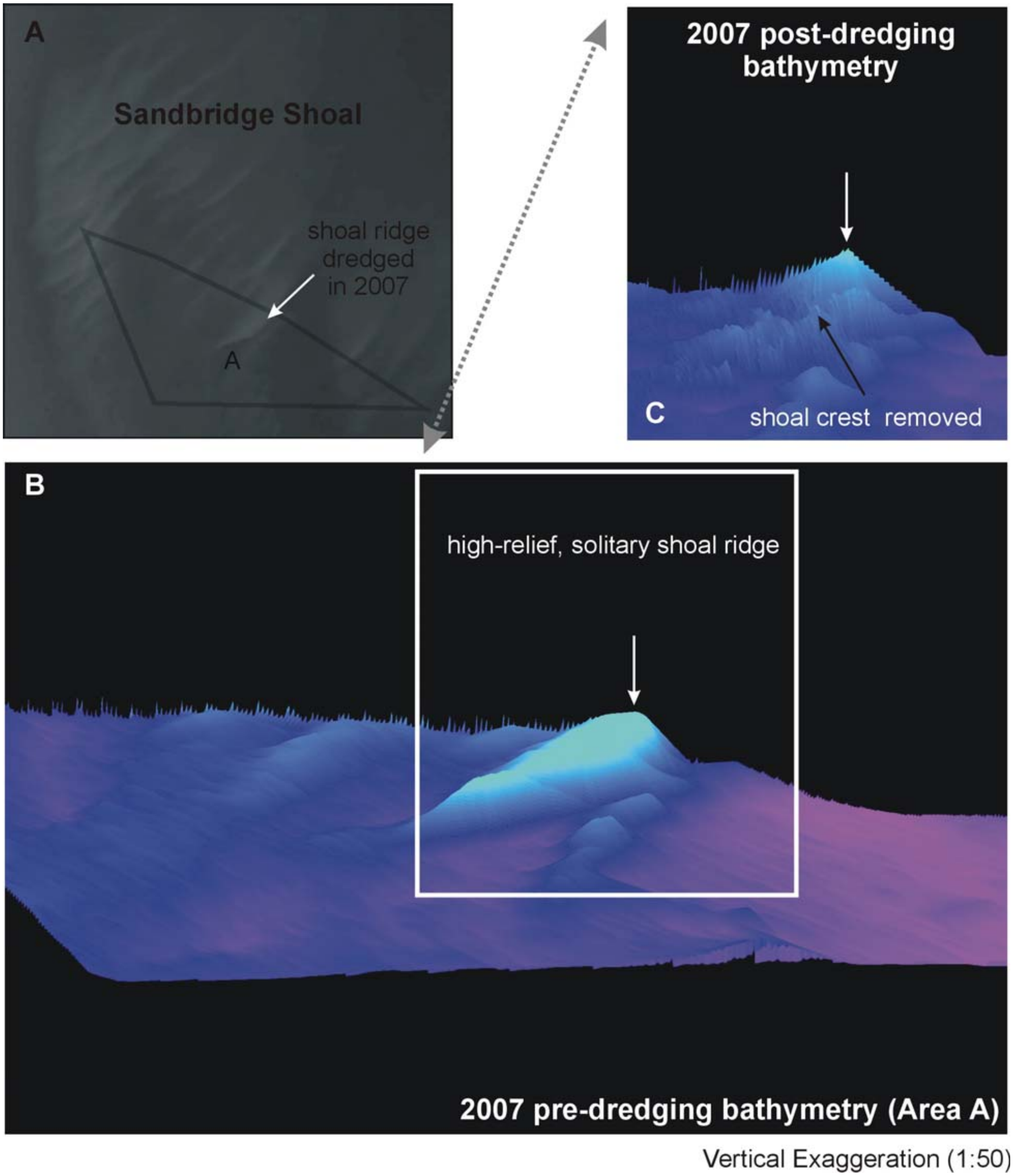


Figure 4: Pre- and post-dredging conditions in 2007 for a subregion of Area A.

The most abundant benthic, taxonomic group observed during monitoring was polychaetes. Other benthic species observed included amphiods, bivalves, lancelets, and to a lesser extent, decapods, nemerteans, echinoderms, anemonies, isopods, gastropods, phoronids, and tunicates. Interestingly, Diaz et al. (2006) observed that macrobenthic production east and west of the shoal was about 2.5 times more productive than the shoal crest. Cutter and Diaz (1998) also found benthic production to be higher off shoal relative to on shoal. The community composition on and around Sandbridge Shoal for 2002-2005 was similar to previous work. Cutter and Diaz (1998) found polychaetes, amphipods, decapods, bivalves, sand dollars, and lancelets to be the dominant groups. The average macrofaunal abundance in 1996 and 1997 was 1.5 to 2.5 times lower than 2002 to 2005 conditions. Monitoring revealed no significant difference in macrofaunal abundance between dredged areas (Area B) and controls, suggesting that dredging within Area B has had little impact on habitat value.

During the three-year monitoring period, a total of 1,600 fishes and skates, representing 12 taxa, and 1,000 invertebrates, representing 12 taxa, were collected. The most common fishes were the sea robins, accounting for 32% of all fishes. Spotted hake was the second most abundant and accounted for 26% of the fishes, even though it did not occur in any trawl in 2002. Butterfish were 16% of the fishes, even though it did not occur in 2002. Pinfish and smallmouth flounder were 16% and 6% of the fishes, respectively. Other flounders, mostly summer flounder, and black sea bass were about 1% of the fishes. The trawls also collected mobile and sessile invertebrates that were not collected quantitatively by grab sampling. The most abundant being hermit crabs (*Pagurus* spp.), and sand shrimp (*Crangon septemspinosa*), followed by the Atlantic brief squid (*Lolliguncula brevis*), and one individual of the Atlantic bobtail squid (*Rossia* sp.). There were no significant differences between sampling locations (on and off shoal) or between years in the abundance of sea robins, smallmouth flounder, or pinfish. Diaz et al. (2006) reported no statistically significant preference in use of habitat, but noted that the odds of occurrence varied through time, showing off shoal preference for some years, and on shoal for others. For the most abundant fishes, there were no differences in habitat utilization, but fishes generally showed broad preference for sandy habitat (Diaz et al., 2003). Following dredging, most demersal fishes, except the spotted hake and smallmouth flounder, were more likely to be on shoal. Gut content and stable isotopic analyses were conducted during the multi-year monitoring effort. The most common food items consumed by demersal fishes were epifaunal and/or infaunal species in the decapod, amphipod, and mysid taxonomic groups. There were notable differences in diets between fish species, but no differences in feeding patterns were observed within particular species across sampling locations or years. The food web in the vicinity of Sandbridge Shoal was generally limited to two trophic levels beyond the primary producers; primary consumers, such as bivalves and amphipods, supported secondary consumers and demersal fish at the third trophic level. Top level species were spotted hake and weakfish.

VI. Identification of Managed Species

<u>Square I</u>

<u>10' x 10' Square Coordinates:</u>

Boundary	North	East	South	West
Coordinate	36° 50.0' N	75° 50.0' W	36° 40.0' N	76° 00.0' W

Square Description: Waters within the Atlantic Ocean within the square affecting North Bay, Shipps Bay, and southern Virginia Beach. These waters affect the following: Muddy Creek, Porpoise Pt., and northern Long I., and affect Virginia Beach from Rudee Inlet on the north, south past Sandbridge Beach, VA., to east of half way down Long I., just north of the Wash Flats.

<u>Square II</u>

<u>10' x 10' Square Coordinates:</u>

Boundary	North	East	South	West
Coordinate	36° 50.0' N	75° 40.0' W	36° 40.0' N	75° 50.0' W

Square Description: Waters within the Atlantic Ocean within the square one square east of the square affecting and within North Bay and Shipps Bay and affecting southern Virginia Beach.

<u>Compiled Species List: Square Coordinates I and II</u>

Species	Eggs	Larvae	Juveniles	Adults
red hake *(Urophycis chuss)*	X	X	X	
witch flounder *(Glyptocephalus cynoglossus)*	X			
windowpane flounder *(Scopthalmus aquosus)*	X	X	X	
Atlantic sea herring *(Clupea harengus)*			X	X
monkfish *(Lophius americanus)*	X	X		
bluefish *(Pomatomus saltatrix)*			X	X

Species	Eggs	Larvae	Juveniles	Adults
Atlantic butterfish *(Peprilus triacanthus)*			X	
summer flounder *(Paralicthys dentatus)*			X	X
scup *(Stenotomus chrysops)*	n/a	n/a	X	X
black sea bass *(Centropristus striata)*	n/a	X	X	X
surf clam *(Spisula solidissima)*	n/a	n/a	X	
spiny dogfish *(Squalus acanthias)*	n/a	n/a	X	X
king mackerel *(Scomberomorus cavalla)*	X	X	X	X
Spanish mackerel *(Scomberomorus maculatus)*	X	X	X	X
cobia *(Rachycentron canadum)*	X	X	X	X
red drum *(Sciaenops occelatus)*	X	X	X	X
sand tiger shark *(Odontaspis taurus)*		X		X
Atl. sharpnose shark *(Rhizopriondon terraenovae)*				X
dusky shark *(Charcharinus obscurus)*		X	X	
sandbar shark *(Charcharinus plumbeus)*		X	X	X
sandbar shark *(Charcharinus plumbeus)*		HAPC	HAPC	HAPC
scalloped hammerhead shark *(Sphyrna lewini)*			X	
tiger shark *(Galeocerdo cuvieri)*		X	X	X
winter skate *(Leucoraja ocellata)*			X	
clearnose skate *(Raja eglanteria)*			X	X

Source: National Marine Fisheries Service: "Summary of EFH Designation" posted on the internet at http://www.nero.noaa.gov/hcd/webintro.html and EFH Designations for New England Skate Complex posted at http://www.nero.noaa.gov/hcd/skateefhmaps.htm

The notation "X" in a table indicates that EFH has been designated within the square for a given species and life stage.

The notation "n/a" in the tables indicates some of the species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle. These species are: redfish, which have no eggs (larvae born already hatched); long finned squid, short finned squid, surf clam, and ocean quahog which are referred to as pre-recruits and recruits (this corresponds with juveniles and adults in the tables); spiny dogfish, which have no eggs or larvae (juveniles born live); scup and black sea bass, for which there is insufficient data for the life stages listed, and no EFH designation has been made as of yet (some estuary data is available for all the life stages of these species, and some of the estuary squares will reflect this).

VII. Evaluation of Impacts on EFH Species

This section contains official EFH description language, relevant background information and an evaluation of potential impacts at Sandbridge Shoal and Sandbridge Beach for each species. Official EFH description language for all species is excerpted from the NMFS "Guide to Essential Fish Habitat Description" website http://www.nero.noaa.gov/hcd/list.htm. The descriptions describe the geographical extent in which the EFH is found, as well as the type of habitats utilized by each lifestage of the species evaluated in this report. NMFS groups three of the species, king mackerel, Spanish mackerel, and cobia, and describes them collectively under the category of "coastal migratory pelagics." EFH descriptions contained below for these individual species have been subdivided from this group. The life stages of bony and cartilaginous fish are distinct from each other at subadult stages. EFH is designated for egg, larval, juvenile, and adult life history stages of bony fish. EFH is designated for egg, neonate/early juvenile, late juvenile/subadult, and adult life history stages of cartilaginous fish. Portions of the area are designated as Habitat of Particular Concern (HAPC) for the sandbar shark.

Fish occupation of waters within the project impact area is highly variable, both spatially and temporally. Some of the species are found strictly offshore, while others may occupy both nearshore and offshore waters. Some species may be suited for open-ocean or pelagic waters, while others may be more oriented to bottom or demersal waters. This can also vary between life stages of federally managed species. Additionally, seasonal abundance is highly variable, as many species are highly migratory.

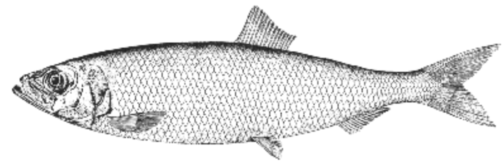
Direct impacts to each finfish species are evaluated largely based on their likelihood of being physically present, and therefore potentially physically harmed at either the proposed borrow areas or beach fill placement areas during project construction. Finfish could be directly impacted during dredging of sand by being entrained into the dredge or by being struck by the dredge plant. At Sandbridge Beach, direct impacts to finfish could potentially occur while sand is being pumped off the hopper dredge and placed (or moved along) the beach and in the surf zone. With the exception of some less motile juvenile species, most pelagic and demersal species are highly mobile and should be able to avoid entrainment in the dredge. While individual finfish of a number of species will likely be entrained into the dredge and destroyed, no detrimental impacts to the populations of any finfish are expected from the proposed project.

Indirect impacts to each finfish species could occur as a result of several aspects of the project. EFH species can be adversely impacted temporarily due to increased turbidity and decreased dissolved oxygen content during the dredging and placement, or temporary changes in local bottom habitat conditions (W.F. Baird & Associates and Research Planning, 2004). The turbidity and dissolved oxygen impacts would subside upon cessation of construction activities. There is only a minor portion of fine-grained sediment within the material to be dredged and placed, and turbidity can be pronounced locally at both sites naturally as a result of wave re-suspension of bottom sediments at any time of year. For these reasons it is assumed that indirect impacts from turbidity will be short-lived and localized (MMS, 1999). In addition, because of the open nature of Sandbridge Shoal, turbidity should decrease as the particles in the water column rapidly dissipate into the surrounding coastal ocean waters.

Relatively non-motile benthos, such as polychaetes and molluscs, will be destroyed over much of the area to be dredged; this may result in local loss of prey items for finfish following dredging until benthic communities recover. Recovery time of the benthos within both the dredging area and within the seawardly-translated surf zone of Sandbridge Beach is expected to be relatively rapid. Substantial recovery of both areas should occur within several months. Full recovery of both sites by benthos to a condition resembling pre-project conditions may take several years (Nelson, 1993; Newell et al., 1998; USACE, 2001; Jutte et al., 2002; Posey and Alphin, 2002). Naturally-occurring physical processes, often magnified by tropical and extra-tropical storms, are expected to be the foremost control on benthic habitat conditions and benthic community at any given time (Diaz et al., 2006). Recolonization of the borrow area substrate by benthos is expected to be facilitated by the likely presence of undisturbed bottom on the ridges between the furrows within the otherwise dredged area, as well as large regions of the shoal that are not dredged. Changes to the benthic community and habitat quality could result in impacts to the foodweb. These impacts are expected to be short-lived and localized.

Dredging may also result in physical alterations to the substrate and seafloor morphology. Changes in substrate could result in changes to benthic community assemblages after recolonization, or in unsuitable substrate for the spawning of some finfish species. For instance, should an area of the shoal be dredged too extensively, a substrate of course sandy material could be replaced with a substrate of clays. However, changes in substrate are not expected because dredging depths would generally be limited to depths characterized by beach-compatible sand; these suitable dredge depths are based on extensive vibracore data and minimize the probability of dissimilar substrates being exposed. Indirect impacts to finfish could potentially occur along the shoreline as shallow ocean water surf zone habitat is converted to inter-tidal and supra-tidal beach habitat. Seaward translation of the shoreline, profile equilibration, alongshore spreading, and "loss" of nearshore open water habitat is not expected to cause any significant indirect impacts to finfish; in a general sense, this habitat will only be translated seaward rather than "lost" because of the relative vastness of the seafloor.

1. Atlantic Herring (*Clupea harengus*)



A. EFH for Atlantic Herring:

Juveniles: Pelagic waters and bottom habitats in the Gulf of Maine, Georges Bank, southern New England and the middle Atlantic south to Cape Hatteras as depicted in Figure 3.3. Generally, the following conditions exist where Atlantic herring juveniles are found: water temperatures below 10° C, water depths from 15 - 135 meters, and a salinity range from 26 -32%.

Adults: Pelagic waters and bottom habitats in the Gulf of Maine, Georges Bank, southern New England and the middle Atlantic south to Cape Hatteras. Generally the following conditions exist where Atlantic herring adults are found: water temperatures below 10º C water depth from 20-130 meters, and salinity above 28 ppt.

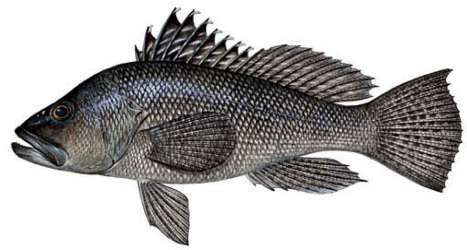
B. Background

The Atlantic herring is a coastal pelagic species that inhabits both sides of the North Atlantic Ocean (Reid et al., 1999), as well as the northeast Pacific Ocean (Robins et al., 1986). In the western North Atlantic they range from Labrador to Cape Hatteras. Juveniles and adults undergo complex north-south and inshore-offshore migrations for feeding, spawning, and overwintering. The Georges Bank/Nantucket Shoals stock overwinter south of Cape Cod and along the mid-Atlantic coast. The stock moves north onto Georges Bank and into the Gulf of Maine in the spring before congregating on spawning grounds southeast of Nantucket and on Georges Bank in the fall. The migrations of coastal adults are less well known. Adults in the western Gulf of Maine may migrate southwest along the coast after spawning and overwinter at the western extreme of their migratory path, possibly south of Cape Cod. Vertical migrations linked to changing light intensity are pronounced and are probably related to movements of prey and avoidance of predatory seabirds. Adults have a diet dominated by krill shrimp, arrow worms, copepods, amphipods, and flying snails (pteropods). Spring and autumn spawing populations support major commercial fisheries (Reid et al., 1999). Atlantic herring were extremely abundant in northeastern U.S. waters during the 1960's and were fished intensively by a large foreign fleet. In the early 1970's the Georges Bank-Nantucket Shoals fishery stock collapsed. Landings remained low for about 10 years, but stock biomass is now high and apparently increasing. The stock complex is underutilized, although the Gulf of Maine portion of the complex may be fully exploited (Reid et al., 1999). As of 1997, Atlantic herring was not overfished (NMFS, 2001). Favored habitat for the species are pelagic waters and bottom habitats in the middle Atlantic south to Cape Hatteras in water temperatures below 50°F (10°C), water depth from 20 to 130 m (65 to 426 ft).

C. Project Impacts

Adult and juvenile Atlantic sea herring are unlikely to be present in the sand placement or dredge area because of their preference for greater water depths and colder water temperatures as noted in the EFH description. Therefore, no direct or indirect impacts from sand borrow or placement are expected.

2. **Black sea bass** *(Centropristis striata)*



A. EFH for Black sea bass:

Larvae: 1) North of Cape Hatteras, EFH is the pelagic waters found over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all ranked ten-minute squares of the area where black sea bass larvae are collected in the MARMAP survey. 2) EFH includes estuaries where black sea bass were identified as common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. Generally, the habitats for the transforming (to juveniles) larvae are near the coastal areas and into marine parts of estuaries between Virginia and New York. When larvae become demersal, they are generally found on structured inshore habitat such as sponge beds.

Juveniles**:** 1) Offshore, EFH is the demersal waters over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked squares of the area where juvenile black sea bass are collected in the NEFSC trawl survey. 2) Inshore, EFH is the estuaries where black sea bass are identified as being common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. Juveniles are found in the estuaries in the summer and spring. Generally, juvenile black sea bass are found in waters warmer than 43^{o} F with salinities greater than 18 ppt and coastal areas between Virginia and Massachusetts, but winter offshore from New Jersey and south. Juvenile black sea bass are usually found in association with rough bottom, shellfish and eelgrass beds, man-made structures in sandy-shelly areas; offshore clam beds and shell patches may also be used during the wintering.

Adults: 1) Offshore, EFH is the demersal waters over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares of the area where adult black sea bass are collected in the NEFSC trawl survey. 2) Inshore, EFH is the estuaries where adult black sea bass were identified as being common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. Black sea bass are generally found in estuaries from May through October. Wintering adults (November through April) are generally offshore, south of New York to North Carolina. Temperatures above 43^{o} F seem to be the minimum requirements. Structured habitats (natural and man-made), sand and shell are usually the substrate preference.

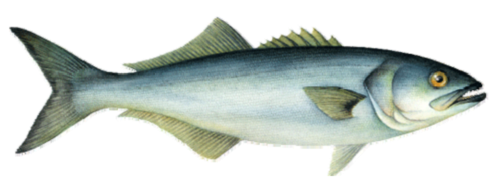
B. Background

Black sea bass is a warm temperate, demersal species that utilizes open water and structured benthic habitats for feeding and shelter. They occur from Nova Scotia to Florida in the Atlantic (Steimle et al., 1999), and throughout the entire Gulf of Mexico (Robins et al., 1986). Their distribution changes seasonally as they migrate from coastal areas to the outer continental shelf when water temperatures decline in the Fall. They also migrate from the outer shelf to inshore areas as temperatures warm in the Spring (Steimle et al., 1999). Juveniles are typically found in areas with structures, including shells, sponge beds, and cobbles and not commonly found on open unvegetated bottoms. Juveniles prey upon small epibenthic invertebrates, especially crustaceans and molluscs. Black sea bass support a commercial and recreational fishery (Steimle et al., 1999). Within the Mid-Atlantic States, recreational landings are comparable to or exceed the commercial fishery (MMS, 1999). The black sea bass population in the mid-Atlantic is overexploited (Steimle et al., 1999).

C. Project Impacts

Black sea bass larvae may be present in the inter-tidal zone during sand placement and within the borrow areas during dredging. Demersal larvae tend to be present in association with structure (e.g., shells) and depressions on the shoal seafloor, which are not commonly found in the borrow areas. Should demersal larvae be present, they may be drawn into the dredge and destroyed. No impacts to the larvae population are expected because there is no reason to expect that black sea bass larvae will be concentrated in the dredging area. Furthermore, the area to be impacted compared with the area of the continental shelf over which the larvae are likely to occur is relatively small in scale. Juveniles and adults may be present during sand placement on the Sandbridge shoreline. However, the area does not possess pronounced benthic cover or suitable substrate to which they would orient, and their numbers would likely be few. However, any black sea bass remaining on the bottom or venturing too close to the dredge intake could be entrained; juveniles would probably be more vulnerable because of their slower swimming speed. There is no reason to expect that black sea bass will be concentrated in the dredging area, therefore no significant impacts to the black sea bass population are expected (Diaz et al., 2006). Black sea bass juveniles and adults may suffer minor indirect impacts from food web disturbance caused by destruction of benthos and altered habitat conditions within the proposed borrow areas. However, because of the temporary and localized nature of the impacts, and relatively small area of bottom to be disturbed compared to the total area of comparable bottom habitat available, impacts are expected to be very minor. Enhanced topography on the shoal seafloor following dredging may provide a benefit to black sea bass by increasing bottom heterogeneity and enhancing habitat. Though, benefits would be very minor because of the relatively small scale of the area impacted. Any beneficial impacts will diminish as natural processes rework the seafloor and furrows fill in with material from the surrounding area.

3. Bluefish *(Pomatomus saltatrix)*



A. EFH for Bluefish:

Juveniles: 1) North of Cape Hatteras, EFH is pelagic waters found over the Continental Shelf (from the coast out to the limits of the EEZ) from Nantucket Island, Massachusetts south to Cape Hatteras, in the highest 90% of the area where juvenile bluefish are collected in the NEFSC trawl survey. 2) South of Cape Hatteras, EFH is 100% of the pelagic waters over the Continental Shelf (from the coast out to the eastern wall of the Gulf Stream) through Key West, Florida. 3) EFH also includes the "slope sea" and Gulf Stream between latitudes 29^{o} 00 N and 40^{o} 00 N. 4) Inshore, EFH is all major estuaries between Penobscot Bay, Maine and St. Johns River, Florida. Generally juvenile bluefish occur in North Atlantic estuaries from June through October, Mid-Atlantic estuaries from May through October, and South Atlantic estuaries March through December, within the "mixing" and "seawater" zones. Distribution of juveniles by temperature, salinity, and depth over the continental shelf is undescribed (Fahay et al., 1999).

Adults: 1) North of Cape Hatteras, EFH is the pelagic waters found over the Continental Shelf (from the coast out to the limits of the EEZ), from Cape Cod Bay, Massachusetts south to Cape Hatteras, in the highest 90% of the area where adult bluefish were collected in the NEFSC trawl survey. 2) South of Cape Hatteras, EFH is 100% of the pelagic waters over the Continental Shelf (from the coast out to the eastern wall of the Gulf Stream) through Key West, Florida. 3) Inshore, EFH is all major estuaries between Penobscot Bay, Maine and St. Johns River, Florida. Adult bluefish are found in North Atlantic estuaries from June through October, Mid-Atlantic estuaries from April through October, and in South Atlantic estuaries from May through January in the "mixing" and "seawater" zones. Bluefish adults are highly migratory and distribution varies seasonally and according to the size of the individuals comprising the schools. Bluefish generally found in normal shelf salinity (> 25 ppt).

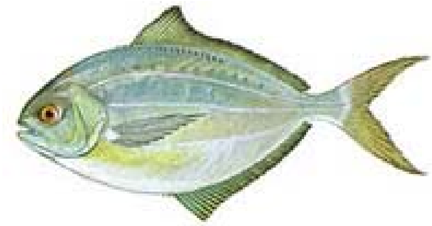
B. Background

Bluefish occur in the western north Atlantic from Nova Scotia to Bermuda and in the western south Atlantic from northern South America to Argentina. They are widely but irregularly distributed elsewhere in the Atlantic and Indian Oceans (Robins et al., 1986). They travel in schools of like-sized individuals and undertake seasonal migrations, moving into the mid-Atlantic Bight during spring and south and farther offshore during fall. Bluefish adults are highly migratory and distribution varies seasonally and according to the size of the individuals comprising the schools. Adults are generally found in areas characterized with oceanic salinities of greater than 25 ppt. Eggs and larvae occur in ocean waters; juveniles have been recorded from all mid-south Atlantic Bight estuaries surveyed (Fahay et al., 1999). Typically, juvenile bluefish remain offshore until the onset of cooling water induces southern migrations. Some juveniles from the summer spawn will migrate into coastal and bay regions for the early portion of fall. They prey upon Atlantic silversides *(Menidia menidia),* herrings, striped bass *(Morone saxatilis),* bay anchovy, and other fish. Large population fluctuations are common (Fahay et al., 1999). Within the Mid and South Atlantic Bight, bluefish is one of the most important recreational species. Among sportfish, bluefish ranked first in the bight from 1979-1989 with catches occurring inshore and offshore. Recreational landings historically exceed commercial landings in the mid-Atlantic region which peaked in 1980 and declined steadily since that time and the stock was considered overharvested. Some improvements to the stock have been reported since 2004.

C. Project Impacts

Juveniles and adult bluefish may be present during dredging and sand placement. However, because of their high mobility they should be readily able to relocate from the project area to avoid direct detrimental impacts. Because of their open water orientation, disturbance to and alteration of bottom habitat at the borrow areas is expected to have minimal indirect impact to bluefish juveniles and adults. Food web impacts caused by the destruction of benthos and alteration of bottom habitat at the borrow areas are unlikely to impact bluefish because of the relatively small scale of the area to be impacted compared to the large abundance of comparable habitat on the continental shelf. Furthermore, prey items will be readily available from elsewhere. Food web impacts at the borrow areas will be temporary in nature, further reducing their potential impact to bluefish.

4. Atlantic Butterfish *(Peprilus triacanthus)*



A. EFH for Butterfish:

Juveniles: Offshore, EFH is the pelagic waters found over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine through Cape Hatteras, North Carolina in areas that comprise the highest 75% of the catch where juvenile butterfish were collected in the NEFSC trawl surveys. Inshore, EFH is the "mixing" and/or "seawater" portions of all the estuaries where juvenile butterfish are "common," "abundant," or "highly abundant" on the Atlantic coast, from Passamaquoddy Bay, Maine to James River, Virginia. Generally, juvenile butterfish are collected in depths between 33 ft and 1200 ft and temperatures between 37°F and 82°F.

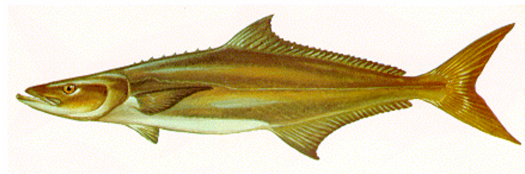
B. Background

Atlantic butterfish range along the Atlantic coast from Newfoundland to Florida, but they are most abundant from the Gulf of Maine to Cape Hatteras. They winter near the outer edge of the continental shelf in the mid-Atlantic Bight and migrate inshore in the spring. During the summer, they occur over the entire mid-Atlantic shelf, including estuaries. In late fall, butterfish move southward and offshore in response to falling water temperatures. Butterfish are primarily pelagic, and form loose schools that feed upon small fish, squid, and crustaceans. They have a high natural mortality rate and are preyed upon by many species including silver hake, bluefish, swordfish, and long-finned squid. During summer, juvenile butterfish associate with jellyfish to avoid predators. Juveniles feed mainly on planktonic prey. Butterfish support a commercial fishery (Cross et al., 1999). The stock is at a low to medium biomass level; although recruitment levels have remained high, the stock size of adults is currently well below average (Mid-Atlantic Fishery Management Council, 2000). Overall, it appears that the butterfish stock is not over fished (Overholtz, 2000).

C. Impact Assessment

Butterfish juveniles may be present in the dredge area and sand placement area, but this is unlikely since juveniles tend to prefer deeper waters as noted in the EFH description. Should juvenile butterfish be in the project areas their high mobility should allow them to relocate from either the dredging or sand placement areas to avoid direct physical harm. No indirect impacts to juvenile butterfish are expected as a consequence of alterations to bottom habitat since juveniles are largely pelagic, and not closely associated with the bottom. No indirect impacts resulting from food web impacts are expected because butterfish are planktivorous and their food items are derived from a wide area. Any food web impacts will be temporary in nature.

5. Cobia *(Rachycentron canadum)*



A. EFH for Cobia

Essential fish habitat for cobia includes sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters, from the surf to the shelf break zone, but from the Gulf Stream shoreward, including *Sargassum.* In addition, all coastal inlets, all state-designated nursery habitats of particular importance to cobia. For cobia, essential fish habitat also includes high salinity bays, estuaries, and seagrass habitat. In addition the Gulf Stream is an essential fish habitat because it provides a mechanism to disperse coastal migratory pelagic larvae. For cobia, essential fish habitat occurs in the South Atlantic and Mid-Atlantic Bights.

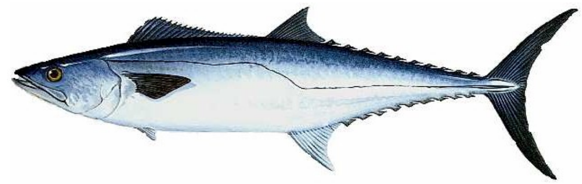
B. Background

Cobia occurs nearly worldwide in warm waters. Within the Atlantic, cobia occurs from Massachusetts to Argentina. Cobia habitat includes the coastal to open ocean; they are common around sea buoys and other floating shelter (Robins et al., 1986), and congregate in the shade of wrecks and pilings (Mills, 2000). Larval habitat is the water column. They move from one area to another and seek prey wherever local resources happen to be abundant (South Atlantic Fishery Management Council, 1998). They forage on bottom-dwelling prey such as shrimp, crab, and sinall fishes (Mills, 2000). Many of their prey species are estuarine-dependent in that they spend all or a portion of their lives in estuaries. They prefer high salinity and temperature governs the occurrence of cobia (South Atlantic Fishery Management Council, 1998). Cobia tend to move about as individuals or occasionally in small groups of two or three (Mills, 2000). East coast cobia stocks move up the coast from the Carolinas reaching tile Chesapeake Bay area in late May and early June when water temperatures rise over 20°C (68°F). Fish in the Chesapeake region migrate out of the region to deeper offshore and more southerly waters in September. Cobia support commercial and recreational fisheries. In the U.S., the cobia recreational catch is speculated to be greater than the commercial catch. Commercial harvests steadily increased along the Atlantic and Gulf coasts over the period from 1981 through the early 1990s, and have remained relatively constant through the 1990s. Current levels of fishing mortality are unknown (Mills, 2000).

C. Project Impacts

Cobia may be in the project area during construction occurring from about May to August. Individual eggs and larvae may be destroyed during dredging and sand placement. However, any cobia eggs or larvae present on the Sandbridge shoreline or within the offshore borrow areas would be widely distributed and there is no reason to believe they would be concentrated in the project area; therefore no significant impacts to the cobia population are expected. Cobia juveniles and adults may be present during dredging at the borrow areas, and cobia juveniles, because of their occurrence on beaches, may be present on the Sandbridge shoreline during sand placement conducted during these months. Because cobia feed on bottom-dwelling prey, individuals could be present on the bottom. Any cobia juveniles or adults that are present in the project area during construction could easily swim away and relocate to adjacent areas to avoid detrimental impacts. Any individuals venturing too close to the dredge intake could be entrained and destroyed, however; juveniles would probably be more vulnerable than adults because of their slower swimming speed. There is no reason to expect that cobia will be concentrated in the dredging area, therefore no significant impacts to the cobia population are expected. Destruction of benthos and alterations of bottom habitat will likely reduce the suitability of the borrow areas as a foraging area for several months to years following dredging. These disturbances are unlikely to impact cobia because abundant undisturbed bottom will remain elsewhere on the continental shelf, and food web impacts will be temporary in nature.

6. King Mackerel (*Scomberomorus cavalla*)



A. EFH for King Mackerel

Essential fish habitat for king mackerel includes sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters, from the surf to the shelf break zone, but from the Gulf Stream shoreward, including *Sargassum.* In addition, all coastal inlets, all state-designated nursery habitats of particular importance to king mackerel. For king mackerel, essential fish habitat also includes high salinity bays, estuaries, and seagrass habitat. In addition the Gulf Stream is an essential fish habitat because it provides a mechanism to disperse coastal migratory pelagic larvae. For king mackerel, essential fish habitat occurs in the South Atlantic and Mid-Atlantic Bights.

B. Background

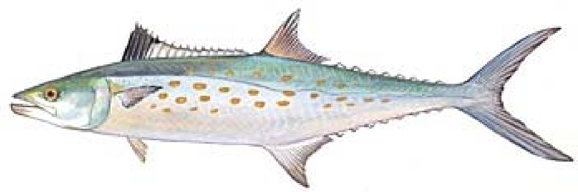
King mackerel inhabit Atlantic coastal waters from Maine to Brazil (Godcharles and Murphy, 1986). King mackerel are surface-dwelling and occur in the nearshore in association with wrecks, towers, reefs, and other structures. The king mackerel migrate in large schools of similarly sized individuals over considerable distances along the Atlantic coast (Murdy et al., 1997). Temperature governs the occurrence of the species; it is seldom found in water temperatures less than 20°C (68°F) and they prefer high salinity (South Atlantic Fishery Management Council, 1998). King mackerel spawn in the south Atlantic (Godcharles and Murphy, 1986). Larval habitat is the water column. The species moves from one area to another and seeks prey wherever local resources happen to be abundant. Many of their prey species are estuarine-dependent in that they spend all or a portion of their lives in estuaries (South Atlantic Fishery Management Council, 1998). King mackerel principally eat fish, but shrimps and squid are also eaten (Murdy et al., 1997). They support important commercial and recreational fisheries along the Atlantic coast and throughout the Gulf of Mexico. Recent stock assessments indicate that management measures in the South Atlantic have been successful at rebuilding the stock. However, they are still in need of protection.

C. Project Impacts

King mackerel may be in the project area during construction occurring from about June to August. Any king mackerel eggs or larvae present on the Sandbridge shoreline or within the offshore borrow areas would be widely distributed and there is no reason to believe they would be concentrated in the project area. Therefore, although eggs or larvae may be destroyed during construction, no significant impacts to the king mackerel population are expected. King mackerel juveniles and adults could be present during dredging, and king mackerel juveniles, because of their occurrence on beaches, may be present on the Sandbridge shoreline during sand placement conducted during these months. However, any juveniles or adults that are present in the project area during construction could easily swim away and relocate to adjacent areas to avoid direct detrimental impacts. Alterations of bottom habitat and destruction of benthos are unlikely to impact king mackerel because abundant comparable bottom habitat occurs elsewhere. Food web impacts will be minimal because of the relatively small scale of impact and temporary nature of the disturbance.

7. Spanish Mackerel (*Scomberomorus maculatus*)

A. EFH for Spanish mackerel



Essential fish habitat for Spanish mackerel includes sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters, from the surf to the shelf break zone, but from the Gulf Stream shoreward, including *Sargassum.* In addition, all coastal inlets, all state-designated nursery habitats of particular importance to Spanish mackerel. For Spanish mackerel, essential fish habitat also includes high salinity bays, estuaries, and seagrass habitat. In addition the Gulf Stream is an essential fish habitat because it provides a mechanism to disperse coastal migratory pelagic larvae. For Spanish mackerel, essential fish habitat occurs in the South Atlantic and Mid-Atlantic Bights.

B. Background

Spanish mackerel inhabit coastal waters from Maine to Mexico (Godcharles and Murphy, 1986). They are a near shore surface-dwelling species (Murdy et al., 1997). Temperature governs the occurrence of the species as it is seldom found in water temperatures less than 20°C. Spanish mackerel move northward each spring, spending summer in the northern part of their range, and migrating south in fall (Godcharles and Murphy, 1986). They spawn from Florida to New York (Godcharles and Murphy, 1986). The species moves from one area to another and seeks prey wherever local resources happen to be abundant. Many of their prey species are estuarine-dependent in that they spend all or a portion of their lives in estuaries (South Atlantic Fishery Management Council, 1998). Spanish mackerel principally eat small fish, shrimp, and squid (Murdy et al., 1997). They support important commercial and recreational fisheries along the Atlantic coast and throughout the Gulf of Mexico. Recent stock assessments indicate that management measures in the South Atlantic have been successful at rebuilding the stock. However, they are still in need of protection.

C. Project Impacts

Spanish mackerel may be in the project area during construction occurring from about June to August. Any Spanish mackerel eggs or larvae present on the Sandbridge shoreline or at the offshore borrow areas would be widely distributed. Therefore, although individual eggs and larvae may be destroyed, there is no reason to expect they would be concentrated in the project area. No significant impacts to the Spanish mackerel population are expected. Spanish mackerel juveniles and adults could be present during dredging, because of their occurrence on beaches.

They may be present on the Sandbridge shoreline during sand placement conducted during these months. However, any juveniles or adults that are present in the project area during construction could easily swim away and relocate to adjacent areas to avoid direct detrimental impacts. Alterations of bottom habitat are unlikely to impact Spanish mackerel because of the minor scale of impact compared to abundant bottom, and food web impacts impacting any of Spanish mackerel prey are expected to be minimal because their prey items are derived from a wide area.

8. Red Drum (*Sciaenops ocellatus*)

A. EFH for Red Drum:

Essential fish habitat includes all of the following habitats to a depth of 50 meters offshore: tidal freshwater; estuarine emergent vegetated wetlands (flooded salt marshes, brackish marsh, tidal creeks); estuarine scrub/shrub (mangrove fringe); submerged rooted vascular plants (sea grasses); oyster reefs and shell banks; unconsolidated bottom (soft sediments); ocean high salinity surf zones; and artificial reefs. The area covered includes Virginia through the Florida Keys.

B. Background

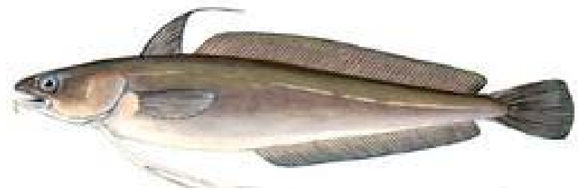
Red drumlive in coastal and estuarine waters from Massachusetts to Mexico, feeding on the bottom for crabs, shrimp, menhaden, mullet and spot. Most reach sexual maturity during their fourth year, when they are about 30 to 37 inches long. Spawning occurs in near-shore coastal waters–along beaches and near inlets and passes–from late summer and into the fall. Red drum are prolific spawners, bearing up to 2 million eggs in a single season. Their eggs hatch within 24 hours and are carried throughout the sounds and estuaries by the tides and winds. Currents into estuaries carry eggs spawned in the ocean where they hatch from August through September. Juvenile drum in these areas feed on zooplankton and invertebrates such as small crabs and shrimp. In N. Carolina, the updated stock assessment indicates that overfishing is no longer occurring and that management action, taken as a result of the 2001 Red Drum FMP, appears to have been effective. In the NMFS' most recent stock status report in 2000, it was noted there has not been a sufficient number of juvenile red drum reaching maturity and subsequently listed the stock as "overfished." Virginia's commercial catch, once as high as 180,000 pounds per year, has been insignificant since 1965.

C. Project Impacts

Red drum eggs and larvae are not likely to be in the project areas. Spawning occurs in late summer through early fall when project construction would be completed or nearing completion. However, as eggs migrate with currents inshore to estuaries, red drum eggs could be present in the project area. Although eggs or larvae may be destroyed during construction, no significant impacts to the red drum population are expected. Additionally, larvae and eggs near the Sandbridge shoreline or at the offshore borrow areas would be widely distributed and there is no reason to believe they would be concentrated in the project area. Red drum juveniles and adults are not likely to be present during the dredging but may inhabit the surface zone during sand placement. Minor impacts to the juvenile population are expected. Juvenile and adult on the

Sandbridge shoreline or at the offshore borrow areas would be widely distributed and there is no reason to believe they would be concentrated in the project area. No significant impacts to the red drum population are expected.

9. Red Hake *(Urophycis chuss)*



A. EFH for Red Hake:

Eggs: Surface waters of the Gulf of Maine, Georges Bank, the continental shelf off southern New England, and the middle Atlantic south to Cape Hatteras. Generally, the following conditions exist where hake eggs are found: sea surface temperatures below 10°C along the inner continental shelf with salinity less than 25%. Red hake eggs are most often observed during the months from May - November, with peaks in June and July.

Larvae: Surface waters of Gulf of Maine, Georges Bank, the continental shelf off southern New England, and the middle Atlantic south to Cape Hatteras. Generally, the following conditions exist where red hake larvae are found: sea surface temperatures below 19° C, water depths less than 200 meters, and salinity greater than 0.5%. Red hake larvae are most often observed from May through December, with peaks in September - October.

Juveniles: Bottom habitats with a substrate of shell fragments, including areas with an abundance of live scallops, in the Gulf of Maine, on Georges Bank, the continental shelf off southern New England, and the middle Atlantic south to Cape Hatteras. Generally, the following conditions exist where red hake juveniles are found: water temperatures below 16° C, depths less than 100 meters and a salinity range from 31 - 33%.

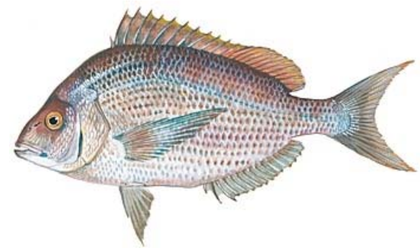
B. Background

Red hake is a demersal fish that occurs from North Carolina to Southern Newfoundland and is most abundant between Georges Bank and New Jersey. Red hake make seasonal migrations to follow preferred temperature ranges. During the warmer months, they are commonly found in depths less than 100 m. During the colder months, they are most commonly found in depths greater than 100 m. Major spawning areas occur on the southwest part of Georges Bank and on the continental shelf off southern New England and eastern Long Island, and in southern New England estuaries during the summer. The pelagic eggs of red hake are not separated from eggs of similar species in field collections; thus, the characteristics of the habitat in which red hake eggs are commonly found are poorly known. Eggs are buoyant and float near the water surface. During December through April, the undifferentiated eggs of hake species have been collected mostly at the edge of the continental shelf on southern Georges Bank and the Middle Atlantic Bight. During warmer months, hake eggs have been collected across the entire shelf in this area. Larval red hake dominate the summer ichthyoplankton in the Middle Atlantic Bight and were most abundant at mid-and outer continental shelf stations. Larval red hake have been collected in the upper water column from May through December and have been collected most abundantly during surveys in September-October. Red hake larvae have been collected on the middle to outer continental shelf of the Middle Atlantic Bight at temperatures between 8 and 23°C (most were collected between 11-19°C) within water depths between 10 and 200 m, with a few deeper occurrences. The distribution of juveniles varies with season. Recently metamorphosed juveniles remain pelagic for about two months. They then gradually descend to the bottom. Demersal settlement generally occurs between September and December with peaks in October-November. Shelter is a critical habitat requirement for red hake. Juveniles occur in depressions on the open seabed, often with living sea scallops *(Placopecten magellanicus),* Atlantic surf clam *(Spisula solidissima)* shells, biogenic depressions, moon snail egg, anemone and polychaete tubes, submerged man-made objects, debris, and artificial reefs. Larger juveniles remain near scallop beds and other structures in coastal areas and embayments; later they join older fish in an offshore migration in the Middle Atlantic Bight. In the Middle Atlantic Bight, red hake juveniles occur most frequently in coastal waters in the spring and fall; they move offshore to avoid the warm summer temperatures. In the winter, most of the population moves offshore. Winter migrants return inshore the following spring. In bottom trawl surveys, juvenile red hake were most abundant at temperatures of 3-16°C and at depths < 120 m; there were seasonal shifts in apparent preferences. Red hake may prefer silty, fine sand sediments. Larvae prey mainly on micro-crustaceans. Juvenile red hake leave shelter at night and commonly prey on small benthic and pelagic crustaceans, bristle worms, and arrow worms. Red hake (presumably mostly juveniles) are eaten by larger predatory fish, harbor porpoise *(Phocoena phocoena)* and other predators. Red hake supports a commercial fishery and is managed as two stocks, northern and southern, separated by Georges Bank. The southern stock (or overall stock) is currently considered overfished (Steimle, 1999).

C. Project Impacts

Red hake eggs are not likely to be present in the dredge and placement area because of their preference for water temperatures below 10º C; therefore, it is unlikely that red hake eggs will be directly impacted by the operation. Demersal red hake larvae are unlikely to be in the project areas. They tend to be present in association with structure (e.g., shells) and depressions on the shoal seafloor, which may be found in the troughs of ridges within the borrow areas. Should demersal larvae be present they may be drawn into the dredge and destroyed. However, because there is no reason to expect that large populations of red hake larvae will be concentrated in the dredging area, and because of the relatively small scale of the area to be impacted compared with the area of the continental shelf over which larvae are likely to occur, no significant impacts to red hake populations are expected. Juvenile red hake may be in the project area during dredging; however, they tend to prefer inshore waters further north, which match their preference for colder temperatures during the spring and summer. Furthermore, red hake favor sediments which are finer than those of the sand placement and dredge areas. Should red hake be present during dredging it is expected that because of their high mobility juveniles should easily be able to avoid intake. Any red hake juveniles remaining on the bottom or venturing too close to the dredge intake could be entrained and destroyed. Detrimental impacts to the red hake population from destruction of individual juveniles are expected to be insignificant because there is no reason to expect that red hake will be concentrated at the site. Food web impacts will be temporary in nature, further minimizing detrimental impacts. Increased bathymetric relief, left by the dredge as a series of ridges and furrows, may favor red hake larvae and juveniles. This beneficial impact would be very minor because of the relatively small size of the area impacted and would be expected to gradually dissipate as physical forces rework and smooth the shoal surface.

10. Scup *(Stenotomus chrysops)*



A. EFH for Scup:

Juveniles: 1) Offshore, EFH is the demersal waters over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares of the area where juvenile scup are collected in the NEFSC trawl survey. 2) Inshore, EFH is the estuaries where scup are identified as being common, abundant, or highly abundant in the ELMR database for the “mixing” and “seawater” salinity zones. Juvenile scup, in general during the summer and spring are found in estuaries and bays between Virginia and Massachusetts, in association with various sands, mud, mussel and eelgrass bed type substrates and in water temperatures greater than 45^{o} F and salinity greater than 15 ppt.

Adults: 1) Offshore, EFH is the demersal waters over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares of the area where adult scup are collected in the NEFSC trawl survey. 2) Inshore, EFH is the estuaries where scup were identified as being common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. Generally, wintering adults (November through April) are usually offshore, south of New York to North Carolina, in waters above 45^{o}F.

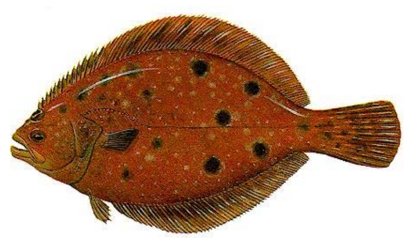
B. Background

Scup occur in the Atlantic from Nova Scotia to Florida (Robins et al., 1986), but primarily from Massachusetts to South Carolina. Scup are a temperate, demersal species that use several benthic habitats from open water to structured areas for feeding and possibly shelter. Their distribution changes seasonally as fish migrate from estuaries to the edge of the continental shelf as water temperatures decline in the winter and return from the edge of the continental shelf to inshore areas as water temperatures rise in the spring. During warmer months, juveniles live inshore in a variety of coastal habitats. Juveniles utilize biogenic depressions, troughs, and possibly mollusc shells, particularly during colder months. Adult habitats include soft sandy bottoms, on or near structures, such as rocky areas and manmade structures. Juveniles feed on small benthic invertebrates, fish eggs, and larvae. Adults prey on benthic and near bottom invertebrates, and small fish. Scup supports a commercial and recreational fishery. The mid-Atlantic stock of scup is currently considered overfished.

C. Project Impacts

Adult scup are common residents in the Middle Atlantic Bight from spring to fall and are generally found in schools on a variety of habitats, from open sandy bottom to structured habitats such as mussel beds, reefs, or rough bottom. Smaller-sized adult scup are common in larger bays and estuaries, but larger sizes tend to be in deeper waters. Scup usually congregate in schools, resulting in congregation in some areas and complete absence in other nearby areas. Schools are reported to be size-structured. During the warm months, scup stay close to shore, typically within 6 miles of the coastline. They live close to the bottom and concentrate over areas of smooth to rocky bottom. Scup feed on small, bottom-dwelling invertebrates (crabs, clams, starfish) and young finfish. With rising water temperatures in the spring, scup return inshore. Larger fish arrive first followed by schools of subadults, which have been reported to appear off southern New England slightly later. The fish reach Chesapeake Bay by April and southern New England by early May. Since scup tend to reside within estuaries during the warmer months, they are not expected to be within the dredge or placement areas during the project timeframe of Spring/Summer. If they are in the area, it is expected that juvenile and adult scup should easily be able to avoid direct detrimental impacts from dredging or sand placement, and easily relocate to adjacent waters. However, because they are demersal, individual scup may remain on the seafloor of the borrow areas during dredging. Any scup remaining on the bottom or venturing too close to the dredge intake could be entrained and destroyed. Juveniles would probably be more vulnerable than adults because of their slower swimming speed. There is no reason to expect that scup would be concentrated in the area to be dredged; therefore, no significant impacts to the scup population are expected. Because of their demersal nature, destruction of benthos and alterations in bottom habitat impacting the food web may cause negative impacts to scup. Because of the relatively small scale of the area to be impacted compared to abundant habitat elsewhere, these are expected to be minor. The impacts will also be temporary in nature, further decreasing their significance.

11. Summer flounder *(Paralichthys dentatus)*



A. EFH for Summer flounder:

Juveniles: 1) North of Cape Hatteras, EFH is the demersal waters over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares for the area where juvenile summer flounder are collected in the NEFSC trawl survey. 2) South of Cape Hatteras, EFH is the waters over the Continental Shelf (from the coast out to the limits of the EEZ) to depths of 500 ft, from Cape Hatteras, North Carolina to Cape Canaveral, Florida. 3) Inshore, EFH is all of the estuaries where summer flounder were identified as being present (rare, common, abundant, or highly abundant) in the ELMR database for the "mixing" and "seawater" salinity zones. In general, juveniles use several estuarine habitats as nursery areas, including salt marsh creeks, seagrass beds, mudflats, and open bay areas in water temperatures greater than 37^{o} F and salinity from 10 to 30 ppt range.

Adults: 1) North of Cape Hatteras, EFH is the demersal waters over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares for the area where adult summer flounder are collected in the NEFSC trawl survey. 2) South of Cape Hatteras, EFH is the waters over the Continental Shelf (from the coast out to the limits of the EEZ) to depths of 500 ft, from Cape Hatteras, North Carolina to Cape Canaveral, Florida. 3) Inshore, EFH is the estuaries where summer flounder were identified as being common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. Generally summer flounder inhabit shallow coastal and estuarine waters during warmer months and move offshore on the outer Continental Shelf at depths of 500 ft in colder months.

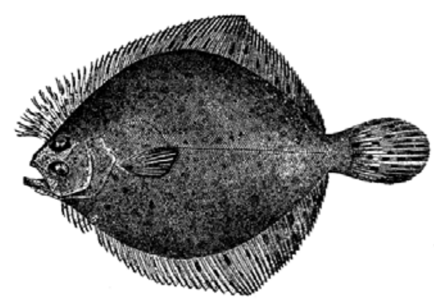
B. Background

Summer flounder, or fluke, inhabit shallow estuarine waters on the outer continental shelf from Nova Scotia to Florida, with a center of abundance in the mid-Atlantic. They exhibit strong seasonal inshore-offshore movements. Adult and juveniles normally inhabit shallow coastal and estuarine waters during the warmer months of the year, and remain offshore during the fall and winter. Smaller juveniles feed upon infauna such as polychaetes while larger juveniles feed upon fish, shrimp, and crabs in relation to their environmental abundance. Adults are opportunistic feeders with fish and crustaceans making up a substantial portion of their diet (Packer et al., 1999). Summer flounder are important both commercially and recreationally in the mid-Atlantic Bight. There is a significant offshore commercial fishery that occurs during the spring inshore migration and fall offshore migration and continues during the winter. During the summer, commercial and recreational fisheries are concentrated in coastal and estuarine waters. The stock is at a medium level of historical abundance and is over-exploited (Packer et al., 1999).

C. Project Impacts

Juveniles and adults may be in the project area during dredging and sand placement. Because of their great mobility, juvenile and adult summer flounder should easily be able to relocate elsewhere and avoid any detrimental impacts. However, because they are demersal, summer flounder may remain on the bottom during dredging. Any summer flounder remaining on the bottom or venturing too close to the dredge intake could be entrained and destroyed. Juveniles would probably be more vulnerable than adults because of their slower swimming speed. No significant impacts to the summer flounder population would be expected from destruction of individuals because there is no reason to believe that summer flounder will be concentrated in the area to be dredged. Because of their demersal nature, destruction of benthos and alterations in bottom habitat impacting the food web may cause detrimental impacts to summer flounder (Diaz et al., 2006). It is unclear whether altered habitat conditions at the borrow areas will have any other indirect impact on summer flounder. These impacts will be very minor in scale, however, when compared to abundant habitat elsewhere on the continental shelf. Food web impacts will be temporary in nature, further diminishing their impact. Any impacts associated with altered bottom habitat on the borrow areas would be expected to gradually dissipate as physical environmental forces rework and smooth the shoal surface.

12. Windowpane flounder *(Scophthalmus aquosus)*



A. EFH for Windowpane flounder:

Eggs: Surface waters around the perimeter of the Gulf of Maine, on Georges Bank, southern New England, and the middle Atlantic south to Cape Hatteras. Generally, the following conditions exist where windowpane flounder eggs are found: sea surface temperatures less than 20º C and water depths less than 70 meters. Windowpane flounder eggs are often observed from February to November with peaks in May and October in the middle Atlantic and July through August on Georges Bank.

Larvae: Pelagic waters around the perimeter of the Gulf of Maine, on Georges Bank, southern New England, and the middle Atlantic south to Cape Hatteras. Generally, the following conditions exist where windowpane flounder larvae are found: sea surface temperatures less than 20° C and water depths less than 70 meters. Windowpane flounder larvae are often observed from February to November with peaks in May and October in the middle Atlantic and July through August on Georges Bank.

Juveniles: Bottom habitats with a substrate of mud or fine-grained sand around the perimeter of the Gulf of Maine, on Georges Bank, southern New England and the middle Atlantic south to Cape Hatteras. Generally, the following conditions exist where windowpane flounder juveniles are found: water temperatures below 25° C, depths from 1 – 100 meters, and salinity between 5.5-36%.

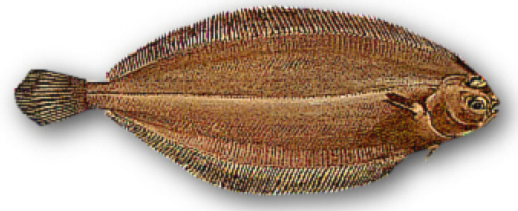
B. Background

Windowpane range from the Gulf of Saint Lawrence to northern Florida (Robins et al, 1986); in the northwest Atlantic they inhabit estuaries, nearshore waters, and the continental shelf. Windowpane juveniles that settle in shallow inshore waters move to deeper waters as they grow migrating to nearshore or estuarine habitats in the southern mid-Atlantic Bight in the autumn. Juvenile and adult windowpane feed on small crustaceans and various fish larvae. Windowpane flounder is not recreationally fished (Murdy et al., 1997), nor a target of the commercial fishing industry (Chang et al., 1999).

C. Project Impacts

Windowpane eggs and larvae are likely to be present in the dredge and placement area, but predominantly in pelagic waters. However, since the eggs are distributed widely over the continental shelf, egg and larvae destruction will not cause significant impacts to the butterfish population. Juveniles and adult windowpane flounders are likely to be in project waters during dredging and sand placement. Because of their great mobility, juveniles and adults should be able to avoid direct detrimental impacts at the dredging and placement sites. However, because they are demersal, individuals may remain on the bottom during dredging. Any windowpane remaining on the bottom or venturing too close to the dredge intake could be entrained and destroyed; juveniles would probably be more vulnerable than adults because of their slower swimming speed. Detrimental impacts to the windowpane flounder population is expected to be insignificant because there is no reason to expect that windowpane flounder will be concentrated at the site. Because of their demersal nature, destruction of benthos and alterations in bottom habitat impacting the food web may cause detrimental impacts to windowpane flounder. It is unclear whether altered habitat conditions at the borrow areas will have any other indirect impact on windowpane flounder. However, these impacts will be very minor because the scale of the area impacted is very minor when compared to abundant habitat elsewhere on the continental shelf. Food web impacts will be temporary in nature, further diminishing their impact. Any impacts associated with altered bottom habitat on borrow areas would be expected to gradually dissipate as physical environment forces rework and smooth the shoal surface.

13. Witch flounder (*Glyptocephalus cynoglossus*)



A. EFH for Witch flounder:

Eggs: Surface waters of the Gulf of Maine, Georges Bank, the continental shelf off southern New England, and the middle Atlantic south to Cape Hatteras. Generally, the following conditions exist where witch flounder eggs are found: sea surface temperatures below 13°C (55°F) over deep water with high salinity. Witch flounder eggs are most often observed during the months from March through October.

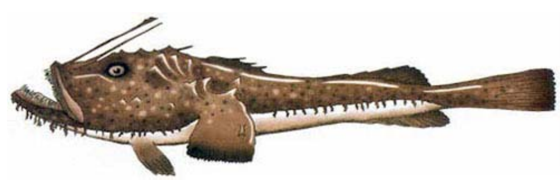
B. Background

The witch flounder, or grey sole, range throughout the Gulf of Maine and also occur in deeper areas on Georges Bank and along the shelf edge as far south as Cape Hatteras. Witch flounder appear to be sedentary, preferring moderately deep areas; few fish are taken shallower than 27 m (88 ft) and most are caught between 110 and 275 m (360-902 ft). Spawning occurs in late spring and summer. Witch flounder are a rather sedentary species and do not appear to undertake long-distance migrations. They concentrate in selected water suitable for spawning, then disperse in the surrounding areas for feeding. A significant aspect of this species is that they appear to have a "built-in" conservation mechanism for the first several years of life. Young witch flounder are either pelagic (midwater) or they live in very deepwater areas. Witch flounder is commercially harvested but populations are currently being maintained.

C. Project Impacts

Witch flounder eggs are unlikely to be present in the sand placement area on Sandbridge Beach because of their preference for colder water temperatures and deeper waters as noted in the EFH description. No direct or indirect impacts are expected. Since witch flounder eggs are unlikely to be found on the bottom where the dredge is drawing in sediment and water, it is unlikely that witch flounder will be directly impacts by that part of the operation. No impacts to witch flounder populations are expected.

14. Monkfish (*Lophius americanus*)



A. EFH for Monkfish

Eggs: Surface waters of the Gulf of Maine, Georges Bank, southern New England, and the middle Atlantic south to Cape Hatteras, North Carolina. Generally, the following conditions exist where monkfish egg veils are found: sea surface temperatures below 18°C (64°F) and water depths from 15-1000 meters (49-3,280 ft). Monkfish egg veils are most often observed during the months from March to September.

Larvae: Pelagic waters of the Gulf of Maine, Georges Bank, southern New England and the middle Atlantic south to Cape Hatteras, North Carolina. Generally, the following conditions exist where monkfish larvae are found: water temperatures 15°C (59°F) and water depths from 25-

1000 meters (82-3,280 ft). Monkfish larvae are most often observed during the months from March to September.

B. Background

The monkfish or goosefish, is a large, slow-growing, bottom-dwelling anglerfish. It occurs from the southern and eastern parts of the Grand Banks, (Newfoundland) and the northern side of the Gulf of St. Lawrence, to the east coast of Florida (to about 29 °N), but is common only north of Cape Hatteras, N. Carolina. They are occasional visitors to the lower Chesapeake Bay from late fall to early spring. The species is easily recognized because of its large spiny head and wide mouth filled with fang-like teeth. Monkfish have very broad, depressed heads (head is as wide as the fish is long) and enormous mouths with long, sharp teeth. They have a modified spine called an "esca." This spine is quite mobile and can be angled forward so it can dangle in front of the fish's mouth and be wiggled like bait to lure its prey. It is a solitary ambush predator of invertebrates. Monkfish are marine bottom-dwelling fishes they inhabit sand, mud, and broken shell bottoms from inshore areas to depths greater than 800 m (2,300 ft). Adults spend most of their time resting on the bottom, often in a depression or partially covered in sediment. Monkfish reach maturity between ages 3 and 4, and spawning can take place from spring through early fall depending on latitude. The species has several unusual aspects to its life history, including releasing its eggs in long, floating, mucus veils. Females lay a non-adhesive, buoyant gelatinous egg mass that floats as a broad raft on the water's surface. Larvae and juveniles are pelagic and remain in this stage for several months before they settle to the bottom at a size of about 3 inches. They live in the water column during the egg and larval stages and shift to a benthic existence during their juvenile and adult stages. For most or all of this life stage, the eggs occur within the mucus veil in the upper part of the water column. Severe weather can damage the veil and release isolated eggs. Eggs were collected near Cape Lookout, North Carolina in March and April, in May off Cape Hatteras, and off southern New England, but not after September (NMFS, 1999). In the NEFSC Marine Resources Monitoring, Assessment and Prediction (MARMAP) ichthyoplankton survey, larvae were first collected over deeper (>984 ft), offshore waters in the Middle Atlantic Bight during March-April; later, larvae were most abundant across the continental shelf at depths between 30 to 90 m (95 to 295 ft) and larvae were most abundant at integrated water column temperatures between 10-16° C (50° to 61° F), although there was one collection at 4° C (39°F) in January. Peak catches generally occurred at 11-15° C (52° to 59° F) regardless of the month or area.

C. Project Impacts

Monkfish eggs and larvae may be, in the project area during construction occurring from about May to early fall. Any monkfish eggs or larvae present at the offshore shoals would be widely distributed and there is no reason to believe they would be concentrated in the project area. Eggs would be unlikely to be entrained during dredging since they float. Since larvae are pelagic, dredging entrainment of larvae would also likely be minimal. Also, larvae generally prefer deeper water conditions than at the borrow area. Accordingly, no significant impacts to the monkfish population are expected. Alterations of bottom habitat and destruction of benthos at the borrow sites are unlikely to impact monkfish eggs or larvae because they lack an orientation to or dependency on bottom habitats.

15. Surfclams (*Spisula solidissima*)

A. EFH for surfclams

Juveniles and adults: Throughout the substrate, to a depth of three feet below the water/sediment interface, within federal waters from the eastern edge of Georges Bank and the Gulf of Maine throughout the Atlantic EEZ, in areas that encompass the top 90% of all the ranked ten-minute squares for the area where surfclams were caught in the NEFSC surfclam and ocean quahog dredge surveys. Surfclams generally occur from the beach zone to a depth of about 200 feet, but beyond about 125 feet abundance is low.

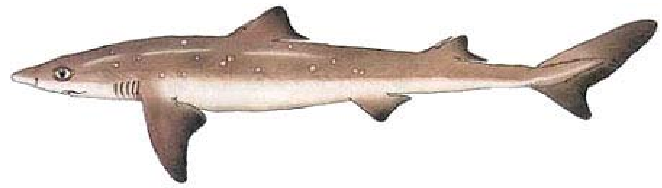
B. Background

The Atlantic surfclam is a bivalve mollusk that inhabits sandy continental shelf habitats from the southern Gulf of St. Lawrence to Cape Hatteras, North Carolina. Commercial concentrations are found primarily off New Jersey, the Delmarva Peninsula, and on Georges Bank. In the Mid-Atlantic region, surfclams are found from the intertidal zone to a depth of about 60 m (197 ft) but densities are low at depths greater than 40 m (130 ft). They occur in both state (≤ 3 mi from shore) and federal waters (i.e. the Exclusive Economic Zone or “EEZ”, between 3 and 200 mi from shore). The greatest concentrations of Atlantic surfclams are usually found in well-sorted, medium sand, but they may also occur in fine sand and silty-fine sand (NMFS, 1999). Maximum size is about 22.5 cm (8.9 in.) shell length and maximum age can reach 30 years. Atlantic surfclam are found in areas where bottom temperatures rarely exceed 25°C (77°F) and where salinities are higher than 28 ppt. In the Middle Atlantic Bight, spawning occurs primarily during summer, although some activity has also been documented in autumn. Full sexual maturity is attained in the second year of life at a shell length of 45 to 85 mm. Eggs and sperm are shed directly into the water column and recruitment to the bottom occurs after a planktonic larval period of about three weeks. Spawning begins and ends earlier in the south. In Virginia, for example, it may begin in May and end in July. There may be a second, minor spawning in October, caused by breakdown of the thermocline. In cold years, the second spawning may not occur. Currents play an important role in determining patterns of distribution and settlement of developing juveniles. Oceanic storms and currents may displace adults considerable distance from burrows; survivors reburrow at new sites (Cargnelli, 1999).

C. Project Impacts

The southeastern portion of the borrow area lies within an area designated as EFH for the juvenile surf clam. Dredging may destroy some surf clam habitat and surf clams living within the dredged area would be killed. While this would represent a significant short-term loss of surf clam in the impact area, although it is expected that habitat conditions for surf clam will be equivalent to those before dredging over time. It is anticipated that surf clam populations would gradually recover to pre-project levels after a several year period. Surf clam predators, including Atlantic cod, would be affected by loss of food until such time as surf clam populations recovered in each borrow site.

16. Spiny dogfish *(Squalus acanthias)*



A. EFH for Spiny dogfish

Juveniles: 1) North of Cape Hatteras, EFH is the waters of the Continental shelf from the Gulf of Maine through Cape Hatteras, North Carolina in areas that encompass the highest 90% of all ranked ten-minute squares for the area where juvenile dogfish were collected in the NEFSC trawl surveys. 2) South of Cape Hatteras, EFH is the waters over the Continental Shelf from Cape Hatteras, North Carolina through Cape Canaveral, Florida, to depths of 1280 ft. 3) Inshore, EFH is the "seawater" portions of the estuaries where dogfish are common or abundant on the Atlantic coast, from Passamaquoddy Bay, Maine to Cape Cod Bay, Massachusetts. Generally, juvenile dogfish are found at depths of 33 to 1,280 ft in water temperatures ranging between 37°F and 82°F.

Adults: 1) North of Cape Hatteras, EFH is the waters of the Continental shelf from the Gulf of Maine through Cape Hatteras, North Carolina in areas that encompass the highest 90% of all ranked ten-minute squares for the area where adult dogfish were collected in the NEFSC trawl surveys. 2) South of Cape Hatteras, EFH is the waters over the Continental Shelf from Cape Hatteras, North Carolina through Cape Canaveral, Florida, to depths of 1,476 ft. 3) Inshore, EFH is the "seawater" portions of the estuaries where dogfish are common or abundant on the Atlantic coast, from Passamaquoddy Bay, Maine to Cape Cod Bay, Massachusetts. Generally, adult dogfish are found at depths of 33 to 1,476 ft in water temperatures ranging between 37°F and 82°F.

B. Background

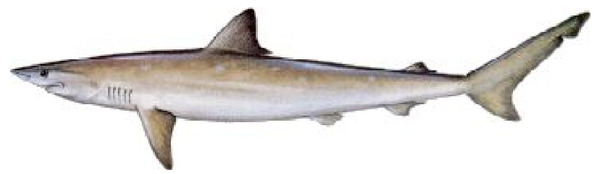
Spiny dogfish are a highly migratory species swimming in large schools with individuals of the same size class staying together as they grow. They are found primarily north of Cape Cod in the summer and move south to Long Island in the fall and as far south as North Carolina in the winter. The spiny dogfish is probably the most abundant shark species in the Western N. Atlantic (NMFS, 1999). Seasonal inshore-offshore movements and coastal migrations are related to water temperature. Generally, spiny dogfish spend summers in inshore waters and overwinter in deeper offshore waters. They are usually epibenthic, but occur throughout the water column and are found from nearshore shallows to offshore shelf waters to 900 m (2,952 ft). In the spring, juveniles and adults occur in deeper, generally warmer waters on the outer shelf from North Carolina to Georges Bank. In the fall, they occur in the shallower, moderately warm waters from southern New England into the Gulf of Maine. Dogfish are transient visitors to estuaries where they prefer higher salinities. The species bears live young, with a gestation period of about 18 to 22 months. Young dogfish, referred to as “pups,” are born head-first. Litter sizes range from 1-15 pups, but usually average 6-7 pups. Spiny dogfish are well known for their voracious and opportunistic predatory behavior. Swimming in large “packs,” they will attack schools of fishes smaller than themselves, including cod, haddock, capelin, mackerel, and herring.

C. Project Impacts

Spiny dogfish may be present within the borrow areas during the cooler (winter-spring) months. Adults and juveniles should easily be able to avoid any direct negative impacts because of their mobility. No detrimental indirect impacts to the population are expected because of the relatively small area to be impacted compared to the range of the species and the ready availability of more preferable habitat on the mid and south-Atlantic Bight continental shelf. Any impacts to the food web are expected to be temporary and local when compared to available habitat elsewhere.

17. Atlantic sharpnose shark (*Rhizoprionodon terraenovae*)

A. EFH for Atlantic Sharpnose***:***



Adults (85 cm TL): From Cape May, NJ south to the North Carolina/ South Carolina border; shallow coastal areas north of Cape Hatteras, NC to the 25 m isobath; south of Cape Hatteras between the 25 and 100 m isobaths; offshore St. Augustine, FL to Cape Canaveral, FL from inshore to the100 m isobath, Mississippi Sound from Perdido Key to the Mississippi River Delta to the 50 m isobath; coastal waters from Galveston to Laguna Madre, TX to the 50 m isobath.

B. Background

This sharpnose ranges as far north as New Brunswick but is rarely found north of North Carolina. The Atlantic sharpnose shark is a small shark that attains a maximum size of 1.2 meters (4 feet). Sexual maturity is reached when an individual is approximately 83 cm (33 inches). Juveniles tend to prefer the inshore environment and are found in common bays, estuaries and even in the surf and adults are primarily found in deeper, offshore waters. They prefer subtropical waters near the continental shelves from the intertidal zone out to deeper waters. They are often found near the surf zone of sandy beaches and in enclosed bays, sounds, harbors, estuaries, and river mouths. This shark is able to tolerate lower salinity levels but, they do not venture into freshwater. The young are nourished within the female, as development is viviparous. Litters of 4 to 7 pups are born in June in shallow waters or estuaries. The newborns are 22 to 35 cm (9 to 14 inches) in length. The principal diet of the sharpnose consists of shrimp, molluscs and small fishes.

C. Project Impacts

Sharpnose sharks may be present during dredging within the borrow areas and sand placement at Sandbridge Beach assuming operations take place during the warmer months. However, adults, because of their ready mobility should easily be able to avoid any direct impacts. No detrimental indirect impacts to the sharpnose shark population are expected because of the relatively small area to be impacted compared to the range of the species and the ready availability of more preferable habitat on the mid and south-Atlantic Bight continental shelf. Any impacts to the food web are expected to be temporary and local.

18. Dusky shark (*Carcharhinus obscurus*)

A. EFH for Dusky Shark***:***

Neonate/early juveniles (115 cm TL): Shallow coastal waters, inlets and estuaries to the 25 m isobath from the eastern end of Long Island, NY at 72° W south to Cape Lookout, NC at 34.5° N; from Cape Lookout south to West Palm Beach, FL (27.5° N), shallow coastal waters, inlets and estuaries and offshore areas to the 100 m isobath.

Late juveniles/subadults (116 to 300 cm TL): Off the coast of southern New England from 70° W west and south, coastal and pelagic waters between the 25 and 200 m isobaths; shallow coastal waters, inlets and estuaries to the 200 m isobath from Assateague Island at the Virginia/Maryland border (38° N) to Jacksonville, FL at 30° N; shallow coastal waters, inlets and estuaries to the 500 m isobath continuing south to the Dry Tortugas, FL at 83° W.

B. Background

The dusky shark is a common species of temperate and tropical waters nearly worldwide (Robins et al., 1986). Along the East Coast it ranges from Georges Bank to Florida and the Gulf of Mexico (Castro, 1993) from the surf zone to far offshore and from the surface to water depths of 400 m. It feeds on numerous species of bony fishes and smaller sharks (Castro, 1993), as well as crustaceans, molluscs, and sea stars (Murdy et al., 1997). Dusky shark migrates north and south with the seasons along the Atlantic coast. Coastal waters are nursery areas. Neonates occur in coastal waters of Chesapeake Bay from April through July (NMFS, 1999), although Murdy and others (1997) note that the species does not normally enter estuaries and is infrequently encountered in Chesapeake Bay. It is an important recreational fishery species (Murdy et al., 1997). The species is particularly vulnerable to overfishing because of its long period until maturity (17 years), slow growth, and limited reproductive potential. The Highly-Migratory-Species Fisheries Management Plan prohibits possession of dusky shark because of significant declines in catch rates in the last two decades (NMFS, 1999).

C. Project Impacts

Dusky shark may be present during dredging within the borrow areas and sand placement at Sandbridge Beach. However, neonates and juveniles, because of their ready mobility, should easily be able to avoid any direct impacts. No detrimental indirect impacts to the dusky shark population are expected because of the relatively small area to be impacted compared to the range of the species and the ready availability of comparable habitat on the mid and south-Atlantic Bight continental shelf. Any impacts to the food web are expected to be insignificant and temporary.

19. Sand tiger shark (*Carcharias taurus*)

A. EFH for Sand Tiger Shark***:***

Neonate/early juveniles (125 cm TL):
Shallow coastal waters from Barnegat Inlet, NJ south to Cape Canaveral, FL to the 25m isobath.

Adults (221 cm TL): Shallow coastal waters to the 25m isobath from Barnegat Inlet, NJ to Cape Lookout; from St. Augustine to Cape Canaveral, FL.

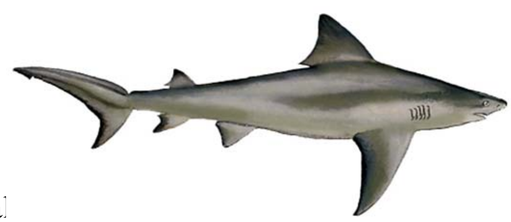
B. Background

This is a coastal species found in tropical and warm temperate waters worldwide (NMFS, 1999). In Atlantic waters, the species ranges from Maine to Florida and also from Brazil to Argentina. It was perhaps the most common shark found in coastal waters from Cape Cod to Chesapeake Bay (Robins et al., 1986). It is often found in shallow coastal waters less than 4 m deep. Sand tigers are the only shark known to come to the surface and gulp air. They store the air in their stomachs, which allows them to float motionless in the water, seeking prey. The neonates are born in March and April in southern portions of its range and migrate northward to summer nurseries in coastal estuaries. Sand tiger shark is extremely vulnerable to overfishing because adults congregate in large numbers in coastal areas during the mating season. There was a severe population decline in the 1990s, and in 1997 NMFS prohibited possession of this species in U.S. waters (NMFS, 1999).

C. Project Impacts

Sand tiger sharks may be present during dredging within the borrow areas and placement of sand at Sandbridge Beach. However, neonates, juveniles, and adults, because of their ready mobility, should easily be able to avoid any direct negative impacts. Indirect impacts to this species are expected to be insignificant because the habitats disturbed at the site and any detrimental food web impacts would be insignificant given the pervasive availability of undisturbed habitat in the Mid- and south-Atlantic Bight. Any food web impacts would be temporary, further minimizing any detrimental impacts.

20. Sandbar shark (*Carcharhinus plumbeus*)



A. EFH for Sandbar Shark***:***

Neonates/early juveniles (90 cm): Shallow coastal areas to the 25 m isobath from Montauk, Long Island, NY at 72° W, south to Cape Canaveral, FL at 80.5° W(all year); nursery areas in shallow coastal waters from Great Bay, NJ to Cape Canaveral, FL, especially Delaware and Chesapeake Bays (seasonal-summer); also shallow coastal waters to up to a depth of 50 m on the west coast of Florida and the Florida Keys from Key Largo at 80.5° W north to south of Cape San Blas, FL at 85.25° W. Typical parameters: salinity-greater than 22 ppt; temperatures-greater than 21° C.

Late juveniles/subadults (91 to 179 cm): Offshore southern New England and Long Island, all waters, coastal and pelagic, north of 40° N and west of 70° W; also, south of 40° N at Barnegat Inlet, NJ, to Cape Canaveral, FL (27.5° N), shallow coastal areas to the 25 m isobath; also, in the winter, from 39° N to 36° N, in the Mid-Atlantic Bight, at the shelf break, benthic areas between the 100 and 200 m isobaths; also, on the west coast of Florida, from shallow coastal waters to the 50 m isobath, from Florida Bay and the Keys at Key Largo north to Cape San Blas, FL at 85.5° W.

Adults (180 cm): On the east coast of the United States, shallow coastal areas from the coast to the 50 m isobath from Nantucket, MA, south to Miami, FL; also, shallow coastal areas from the coast to the 100 m isobath around peninsular Florida to the Florida panhandle at 85.5° W, near Cape San Blas, FL including the Keys and saline portions of Florida Bay.

Habitat Areas of Particular Concern: Important nursery and pupping grounds have been identified in shallow areas and the mouth of Great Bay, NJ, lower and middle Delaware Bay, lower Chesapeake Bay, MD and near the Outer Banks, NC, in areas of Pamlico Sound adjacent to Hatteras and Ocracoke Islands and offshore those islands.

B. Background

The sandbar shark is commonly found over muddy or sandy bottoms in shallow coastal waters such as bays, estuaries, harbors, or the mouths of rivers, but also swims in deeper waters (200 m or more) as well as intertidal zones. They tend to swim alone or gather in sex-segregated schools that vary in size. They are most active at night, at dawn, and at dusk. All life stages of sandbar shark are found along the Virginia coast; neonates are found from March through July in the mid and south Atlantic. The adult sandbar shark undergoes seasonal migrations. These movements are influenced mainly by temperature although it is believed that ocean currents also play a significant role. In the western North Atlantic, adult sandbars move as far north as Cape Cod during the warmer summer months and return south at the start of cooler weather. It tends to prefer waters on continental shelves, oceanic banks, and island terraces but is also commonly found in harbors, estuaries, at the mouths of bays and rivers, and shallow turbid water. The species is highly vulnerable to overfishing because of its long period until maturity (15 or more years) and two-year reproductive cycle. It is one of the most important commercial species in the shark fishery of the southeastern U.S. There have been declines in catch per unit effort in U.S. fisheries for this species as a consequence of heavy fishing pressure (NMFS, 1999).

C. Project Impacts

The sandbar shark may be present during dredging within the borrow areas and sand placement at Sandbridge Beach. Neonates, juveniles, and adults because of their ready mobility, should easily be able to avoid any direct negative impacts. However, since they are bottom dwelling, any individuals remaining on the bottom or venturing too close to the dredge intake could be entrained and destroyed. Neonates and juveniles would probably be more vulnerable than adults because of their slower swimming speed. There is no reason to expect that sandbar shark will be overly concentrated in the dredging area; therefore, no significant impacts to this species' population is expected. Because the sandbar shark is a bottom-dwelling species, indirect impacts to the food web caused by destruction of benthos and alterations in bottom habitat conditions at the borrow areas could be more detrimental. However, since these impacts will be very minor in size when compared to the size of the Mid- and South Atlantic Bight, it is expected that no significant indirect impacts to sandbar shark populations will occur. Any food web impacts are expected be temporary and local in nature.

21. Scalloped hammerhead (*Sphyrna lewini*)

A. EFH for Scalloped Hammerhead***:***

Neonate/early juveniles (45 cm TL):
Shallow coastal waters of the South Atlantic Bight, off the coast of South Carolina, Georgia, and Florida, west of 79.5° W and north of 30° N, from the shoreline out to 25 miles offshore. Additionally, shallow coastal bays and estuaries less than 5 m deep, from Apalachee Bay to St. Andrews Bay, FL.

Late juveniles/subadults (46 to 249 cm TL): All shallow coastal waters of the U.S. Atlantic seaboard from the shoreline to the 200 m isobath from 39° N, south to the vicinity of the Dry Tortugas and the Florida Keys at 82° W; also in the Gulf of Mexico, in the area of Mobile Bay, AL and Gulf Islands National Seashore, all shallow coastal waters from the shoreline out to the 50 m isobath.

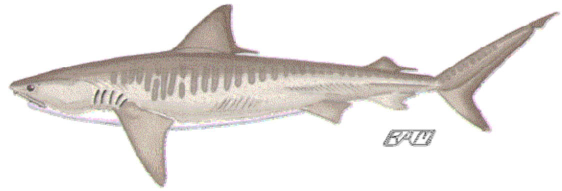
B. Background

Scalloped hammerhead ranges from New Jersey to Uruguay in the western Atlantic, and nearly worldwide in tropical waters (Robins et al., 1986). It is a warm water species seldom found in water cooler than 22°C (72° F). It is a common species found both in coastal and in oceanic waters (Castro, 1993). Juveniles utilize shallow coastal bay and estuarine habitat in waters less than 5 m deep from April through October. Adults utilize both inshore and offshore waters. Scalloped hammerhead school and migrate seasonally north-south along the eastern United States. Because it forms large schools in coastal areas, many fisheries target it and its fins are highly valued. It is probably vulnerable to overfishing (NMFS, 1999).

C. Project Impacts

Scalloped hammerhead juveniles may be in project waters during any construction that takes place between July and August. Juveniles should easily be able to avoid any direct negative impacts of either dredging or sand placement because of their ready mobility. No indirect impacts to scalloped hammerhead are expected from dredging of the borrow areas because any food web impacts resulting from this are expected to be temporary and local when compared to available habitat elsewhere.

22. Tiger shark (*Galeocerdo cuvieri*)



A. EFH for Tiger Shark***:***

Neonate/early juveniles (120cm TL): From shallow coastal areas to the 200 m isobath from Cape Canaveral, FL north to offshore Montauk, Long Island, NY (south of Rhode Island); and from offshore southwest of Cedar Key, FL north to the Florida/Alabama border from shallow coastal areas to the 50 m isobath.

Late juveniles/subadults (121 to 289cm TL): Shallow coastal areas from Mississippi Sound (just west of Mississippi/Alabama border) to the 100 m isobath south to the Florida Keys; around the peninsula of Florida to the 100 m isobath to the Florida/Georgia border; north to Cape Lookout, NC from the 25 to100 m isobath; from Cape Lookout north to just south of the Chesapeake Bay, MD from inshore to the 100 m isobath; north of the mouth of Chesapeake Bay to offshore Montauk, Long Island, NY (to south of Rhode Island between the 25 and 100 m isobaths; south and southwest coasts of Puerto Rico from inshore to the 2,000 m isobath.

Adults (290 cm TL): Offshore from Chesapeake Bay, MD south to Ft. Lauderdale, FL to the western edge of the Gulf Stream; from Cape San Blas, FL to Mississippi Sound between the 25 and 200 m isobaths; off the south and southwest coasts of Puerto Rico from inshore to the 2,000 m isobath.

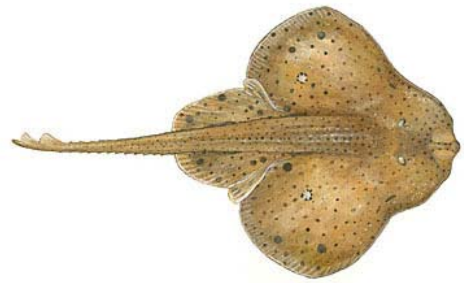
B. Background

The tiger shark ranges from Massachusetts to Uruguay, but is most common from Florida to the Caribbean. It is mostly pelagic, but commonly enters shallow bays and harbors to feed, particularly at night (Robins et al., 1986). Very little is known about the tiger shark's distribution and habitat characteristics. Nursery areas are believed to be offshore, but have not been fully described. The neonates/juveniles occur in shallow coastal waters (NMFS, 1999). The tiger shark feeds on all kinds of marine animals, including turtles, horseshoe crabs, bony fishes, smaller sharks, ray egg cases, and seagulls. It is also one of the few species of sharks that will scavenge dead animals (Castro, 1993). The tiger shark is frequently caught in coastal shark fisheries, but is usually discarded due to low fin and meat value (NMFS, 1999).

C. Project Impacts

Tiger shark may be present during dredging within the borrow areas and sand placement at Sandbridge. Neonates and juveniles should easily be able to avoid any direct negative impacts because of their ready mobility. No indirect impacts to tiger shark are expected from dredging of the borrow areas because any food web impacts resulting from this are expected to be temporary and local when compared to available habitat elsewhere.

23. Winter Skate (*Leucoraja ocellata*)



A. EFH for winter skate:

The map below represents the designation of EFH for the juvenile life history stage based on the areas of highest relative abundance of this species. Only habitats with soft bottom, rocky or gravelly substrates that occur within the shaded (blue) areas are designated as EFH.

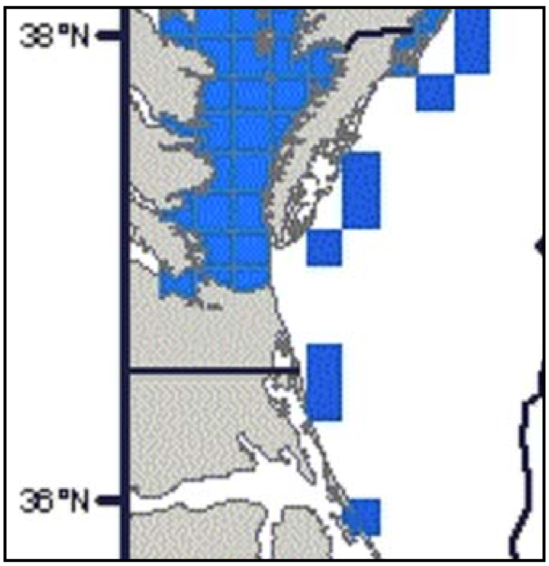


Figure 5: EFH for juvenile Winter Skate

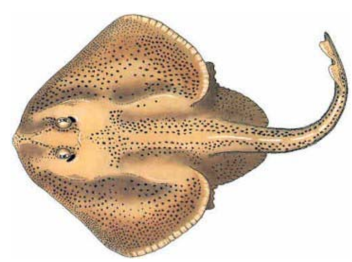
B. Background:

The winter skate occurs in waters from the surface to 90 m (300 feet) in depth, it prefers sand and gravel bottoms in shoal water in the northern portion of its range. The causes of the decline in population status have not been established, but bycatch in fisheries targeting other species is believed to be an important contributing factor. Juveniles are generally found in higher salinity, although some juveniles are found at salinities less than the 20.2 ppt. It is relatively inactive during the day remaining buried in depressions, with most activity occurring during the night time hours (Packer, 2003). The species does not undertake large scale migrations, moving mainly in response to changes in water temperature. Individuals move offshore in summer and early autumn, and move inshore during the winter. Winter skate have been termed a “winter periodic” because their seasonal migration suggests a preference for cool temperatures. The spring and fall distributions of juvenile winter skate are relative to bottom water temperature, depth, and salinity. In spring, they were found in waters between 2°C to 15°C (36°F-59°F) from southern Nova Scotia to Cape Hatteras and their depth range during that season was between about 11-70 m (36-230 ft). They were found at salinities between 32-33 ppt. During the fall, juvenile winter skate were caught over a temperature range of 5°C to 21°C (41°F-70°F) and found at depths between about 21-80 m (69-262 ft). They were found at salinities between 32-33 ppt. Its center of abundance is on Georges Bank and in the northern portion of the Mid-Atlantic Bight. Skate diets consist primarily of polychaetes, amphipods, decapod crustaceans, squid, bivalves, and small fish. Until 2000, the U.S. population of winter skate was considered to be in an overfished state. However, its status has been changed such that it is no longer considered to be in an overfished condition (NMFS 2002). In its 2002 report to Congress, NMFS (2002) reported that the most recent survey index for winter skate indicated that the current biomass was above the minimum stock size threshold and that winter skate were now officially listed as "not overfished". This status for winter skate was reaffirmed by NMFS in its 2003 report to Congress (NMFS 2003). Although winter skate are no longer considered overfished in U.S. waters, winter skate remain at comparatively low levels of abundance.

C. Project Impacts:

Turbidity may impact sight feeding, but the skates will likely flee the area to feed in neighboring waters where turbidity is reduced. Dredging, which usually occurs in late spring or early summer, does not coincide with peak abundance, as the skates have a preference for cooler waters. Although dredging activities may affect feeding success, this will be a temporary occurrence in a relatively small area. Additionally the wide range of prey increases the potential for feeding opportunities. Therefore, no more than minimal impact to the species or feeding success should occur to winter skate.

24. Clearnose Skate *(Raja eglanteria)*



The maps below represent the designation of juvenile and adult EFH for this life history stage based on the areas of highest relative abundance of this species. Only bottom habitats with mud, gravel, soft bottom, rocky or gravelly substrates and sand substrates that occur within the shaded (blue) areas in U.S. waters are designated as EFH.

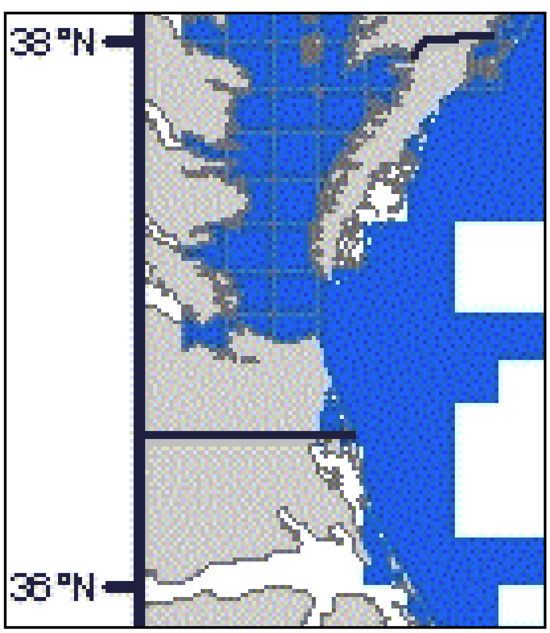


Figure 7: EFH for juvenile Clearnose Skate

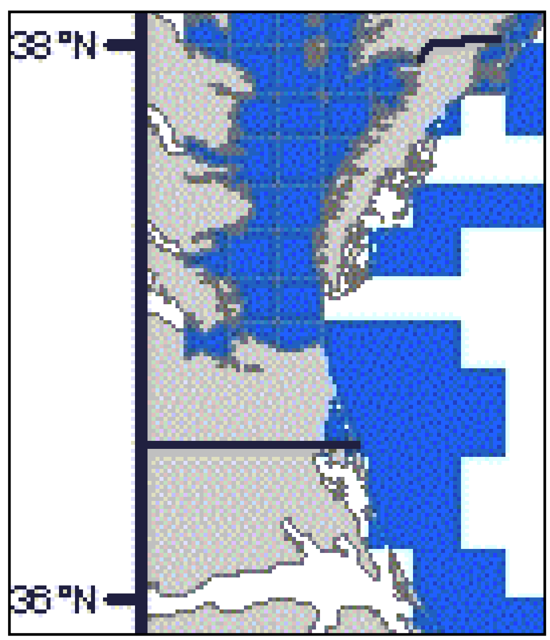


Figure 8: EFH for adult Clearnose Skate

B. Background

The clearnose skate is found in the mild, shallow shores of the Atlantic Ocean (from Massachusetts to south Florida) and in the Gulf of Mexico. It will sometimes be seen as far north as Canada. It is only a warm season visitor in the northern parts of its range, migrating south during the fall and winter. North of Cape Hatteras, it moves inshore and northward along the continental shelf during the spring and early summer, and offshore and southward during autumn and early winter when water temperatures cool to 13-16°C. Most clearnose skates are found at salinities of greater than 22 ppt and temperatures from 6°C- 27°C (43°F- 80°F). Both juveniles and adults can be found in a depth range of between 1-300m (3-985 ft.). NEFSC autumn survey biomass indices increased from the mid 1980's to 2000 but have since declined. The 2003-2005 average biomass index of 0.63 kg/tow is above both the biomass threshold reference point (0.28 kg/tow) and the Bmsy proxy (0.56 kg/tow), and hence the species is not overfished. The 2003-2005 index is lower than the 2002-2004 index of 0.75 by 16% but not by 30% (the average CV), and therefore overfishing is not occurring.

C. Project Impacts

Water quality changes during construction of the proposed project would be minimal and temporary, limited to the immediate area of the activity. Turbidity may impact sight feeding but the skates will flee the area to feed in neighboring waters and the elevated turbidity is temporary. Additionally, juveniles and adults may be found at depths ranging from less than 3 feet up to 985 feet and is broadly distributed along the eastern United States. Therefore, the proposed project would not result in significant adverse impacts to the EFH for this species.

VIII. Cumulative Impacts

It is anticipated that next nourishment of Sandbridge Beach will occur in 2010 with an estimated 1.5 - 2.0 million cubic yards of sand. The U.S. Navy will likely re-nourish the beach and berm at the Dam Neck Naval Training Facility between 2011-2012. The Navy plans to access Sandbridge Shoal to obtain no more than 1.0 million cy. The south portion of the Dam Neck facility beach abuts the northern portion of Sandbridge Beach (the two reaches are separated by a sand fence).

The 1.5 - 2.0 million cy of sand proposed to be removed from Sandbridge Shoal for placement on Sandbridge Beach represents 6 % of the estimated remaining volume of the main shoal body. If the volume present in isolated shoals located seaward of the main shoal body are included, the fraction is even less. Considered in combination with the previous dredging operations, the cumulative volume of sand removed by 2010 will represent less than 25% of the conservative estimates of the volume of Sandbridge Shoal.

It is expected that the shoal will not naturally recover the volume of the sand that is dredged. However, current research sponsored by MMS suggests dredging will not threaten the geomorphic integrity of the shoal (Rob Nairn, personal communication). However, its function as habitat may be adversely affected, but to date, there has been limited evidence of any sustained disturbance beyond transient and localized impacts. The main body of the shoal, when defined by the 13 m isobath and 14 m isobaths (Figure 1), is approximately 1650 acres and 3000 acres respectively. The entire Sandbridge Shoal complex consists of more than 13,500 acres of sand to muddy sand substrate, provided the secondary sand ridges in the immediate vicinity of borrow areas A and B are included. The currently planned project is expected to impact a relative small fraction, approximately 150-300 acres, but no more than 500 acres. The impact can be minimized temporally by rotating borrow areas and disallowing repeated dredging in the same locale. Areas of the shoal where sediment grain-size is incompatible with nourishment grain size requirements, as well as other no-dredge areas such as the submarine cable zone, will also remain intact and undisturbed, serving as feeder zone for benthic recolonization. Additionally, since borrow areas are not typically dredged perfectly flat relative to the adjacent seafloor, a portion of the dredge areas will remain morphologically intact.

Impacts to EFH occur from a vast array of sources, including neighboring navigation channel dredging. The most influential of those sources are impacts from State regulated fishing activities that conduct unsustainable fishing practices and policies. Nearly one third of U.S. marine fisheries have been officially designated as overfished or nearly so. Recreational and commercial fishing activities (scallop dredges, trawls, anchoring, and vessel operations), all directly contact habitats utilized by EFH species. As a result of these impacts commercial harvesting is now being forced to level off after decades of impressive growth. For example, bluefish landings ranked first in the mid and south Atlantic bight from 1979-1989 with catches occurring inshore and offshore. In 1980, commercial and recreational landings of bluefish peaked. Landings have steadily declined since that time and the stock is now considered overharvested.

There are several commercial fisheries that may occur in the general area have impacts to both species of concern and their habitat. Gillnet fishing may be conducted for fish species such as the spiny dogfish and striped bass. Some bycatch is caught along with the targeted species, and this could potentially reduce the population numbers of non-targeted organisms, sublegal size fish and prey species. Many commercially-caught fish species, such as bluefish and Atlantic croaker, are caught by rod and reel or hand line. Impacts include mortality of catch released because of size limits or species prohibitions. If anchoring takes place, there may be some bottom disturbance as well. Stable sand environments often support colonial epifauna such as sponges and bryzoans. When the epiflora is repeatedly removed by bottom fishing, the habitat may become less suitable for commercially valuable fish and shellfish species (Bradstock and Gordon, 1983; Poiner and Kennedy, 1984; Sainsbury, 1988).

Pots and traps may be used for blue crabs and fish species such as black sea bass. During storms these pots and traps may be dragged along the seafloor bottom tearing up benthic habitat and damaging sessile organisms. If these pots and traps break away during storms, they will continue to “fish” for marine organisms that will become trapped and unable to escape.

Trawl fisheries for various fish and invertebrate species have also fished this general area in recent years. Trawl fisheries have targeted bottom fish such as grey seatrout and summer flounder or water column species such as bluefish. Traditional bottom trawls have been shown to remove bottom dwelling organisms such as brittle stars and urchins as well as plant-like organisms and colonial worm tubes (Collie et al., 2000). Colonial epifauna have also been shown to be less abundant in areas disturbed by bottom trawling. This epifauna provides habitat for shrimp, polychaetes and small fish which are potential prey species for commercially desirable fish species. Seafloor areas that have been heavily trawled may bear tracks where trawl doors have gouged into the sediment, changing the sediment surface and in other areas the trawl has flattened the sediment surface reducing habitat for managed species and their prey. Traditional trawl techniques were known to be nonselective in their catch thus having the potential to reduce both prey species and year classes of managed species not yet mature.

Longline fishing for species such as some coastal sharks may occur. Longlining may result in the death of some juvenile and non-target fish species.

Recreational anglers have also caught designated EFH species within the vicinity of the borrow areas (i.e. bluefish, cobia, striped bas, king mackerel) via rod and reel and spear fishing. Mortality of some species is expected from the bycatch of non-target species and sub-legal catches. Additionally, disruption of bottom habitat can occur from the anchoring of recreational boats. Benthos and fish caught by the anchor may be destroyed. Repeated anchoring in same location can lead to patches void of benthic organisms. It can reasonably be assumed that States will continue to license and permit recreational vessels and operations, which do not fall under the purview of a Federal agency. As the recreational activity increases the number moralities will continue to increase as well.

Impacts to EFH can be exacerbated by non-point source pollution. Pollution in Chesapeake Bay and various smaller estuaries in the area can influence fish habitat within the project area because of buoyant plumes that move south along the coast. Runoff from agriculture, stormwater and other sources; carry toxic chemicals and excess nutrients into coastal waters. These can lead to reproductive failure, deformations, death and anoxic habitats. This is of particular concern in estuaries and wetland where reproduction, migration and larval development occur for many of the EFH species found within the project area. Impacts from the non point sources of pollution are expected to continue.

Impacts from natural sources, such as large meteorological events, can also influence EFH species. Hurricanes and nor'easters, typified by increased system energetics, can increase turbidity and destroy bottom habitat used by EFH species and their prey. This can result in detrimental indirect impacts to finfish through changes in the food web. The magnitudes of these impacts range greatly depending on their intensity. Usually they are only temporary in nature.

Given the cumulative impacts associated with the current and future planned beach nourishment projects this project will most likely not add significantly to EFH impacts over time.

IX. Mitigation Measures

Every measure that is technically and economically viable will be pursued to avoid and minimize effects on EFH. Minimization has included implementation of best management practices, extensive consultation with Federal and state agencies, and sampling of beach quality material at the offshore sand source areas to pre-select shoal areas that are most likely to contain beach quality sand. Sand lenses will be mined selectively, following existing bottom contours to the maximum extent practicable. Rotational dredging will be practiced to the maximum extent practicable. Vibracore surveys have been collected to identify the exact location of these sand lenses to minimize the footprint and the hours over which the dredge must operate. Restrictions on open-ocean dredging operations posed by winter weather conditions limit the opportunity to dredge during colder times of the year.

The Corps and MMS will consider all mitigation and recommendations that NMFS proposes through this consultation. Several measures have already been considered and integrated in project plans for reducing impacts to sea turtles and whales. The measures set forth to protected listed species will likely benefit the fish species and habitat described in this assessment. Additionally, the following measures have already been identified:

1) Implement best engineering and management practices.

2) Complete a hydrographic survey before and after dredging covering the entire area where the dredged is expected to operate.

3) Coordinate with NMFS to develop a long-term strategy and dredging management plan to be implemented after the next renourishment cycle that identifies rotation criteria and advance schedule for specific shoal use.

X. Conclusion and Agency View

The severity of the impact to EFH and supported species is dictated by: 1) the spatial extent of the impact and 2) the chronic or long-term nature of the impact. The areas that have been designated as EFH in the project area have been given this classification because they are believed to be "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U. S. C. 1802). HAPC, a separate designation within EFH, is based on one or more of the following considerations: 1) the importance of the ecological function, 2) extent to which the habitat is sensitive to human-induced degradation, 3) whether and to what extent development activities are stressing the habitat type, or 4) rarity of habitat type [50 CFR 600.815(a)(8)].

The two borrow areas within Sandbridge Shoal are Area B to the north and Area A to the south. Area B is approximately 3,519 acres, and Area A is approximately 2,325 acres. During each dredging cycle, approximately 150 to 500 acres of benthic habitat may actually be adversely impacted within those borrow areas in order to obtain needed borrow material. Previous estimates, in excess of 500 acres, were calculated presuming the entire leased area was actually dredged. Compared to the entire shoal complex habitat and the ridge and swale topography in the Mid-Atlantic Bight offshore Virginia, the area of potential impact is relatively small.

If hydrodynamics and sediment transport are locally modified because of dredging, physical changes to the seafloor geomorphology may occur (e.g., substrate type and composition, surface texture, water circulation, and nutrient distribution). Some of the localized physical changes that have been observed in other locations following dredging include: 1) lower sand content; 2) higher silt/clay content; 3) poorer sorting (greater variation in grain size of sediment); and 4) accumulation of fine sediment (Jutte et al., 2002; Diaz et al., 2004). These changes have not been observed to date at Sandbridge Shoal (Diaz et al., 2006). Areas that have high rates of sediment transport (sand, not fine-grained sediment), such as depositional shoals, may experience rapid refilling rates, but that also assumes physical depressions are being created during dredging operations (Greene, 2002). Utilizing hopper dredges to extract thin layers of sediment (approximately 3 ft) over larger areas, rather than dredging single shoals to greater depths over smaller areas, often creates a complex fabric of meso-ridges and furrows. The ridges are essentially the areas missed by the hopper dredge dragarm due to the dredge's inability to completely remove all of the sediment. Shallow cuts are expected to have a smaller impact on waves and currents at the borrow area and presumably decrease the likelihood of exposure of and or infilling by finer-grained sediments. One of the primary concerns regarding the impact of dredging is whether the removal of sand from the shoal will somehow disrupt the physical processes that maintain the shape of sand ridges and shoal bodies. The concern would be that the shoal might deflate or unravel, losing its form over time. Ridge crests are intensely stirred by relatively high wave energy and consist of mixed coarse sediment with low organic material (Diaz et al., 2004; Hayes and Nairn, 2004). Comparatively, the trailing slope of the feature (up wave) is often characterized by a very gentle slope, moderate surface sediment mixing, and deposition of organically enriched fines. There may be at least two other unique physical habitats common to ridge features: 1) the leading side of the ridge is steeper and is depositional in nature (many ridges will be slowly migrating in the direction of this side of the ridge); and 2) deep troughs between the ridges that are relatively sheltered from wave action (due to both depth and breaking of waves over the crest of the ridge) often feature relatively finer sediments. The benthic communities and fish populations associated with each of these habitats are likely to be different (Diaz et al., 2004). It may be inferred that if a shoal did deflate due to dredging impacts, these different community structures could be adversely impacted.

Despite the prevalence of these features along the East Coast, little is documented about the ecological relationships of these features and their associated biological communities (Slacum et al., 2006; Vasslides and Able, 2008). Physical impacts caused by dredging are important only if they result in a coupled biological impact, either directly or indirectly. Dredging will lead to direct mortality of the benthic infauna that live in the substrate. Analysis of sediment core samples taken after dredging has demonstrated that remaining epibenthics are decimated (Parr et al., 1978). Studies investigating the recovery of benthic communities following dredging (Blake et al., 1996; Newell et al., 1998; Van Dolah et al., 1992; Van Dolah et al., 1998; Brooks et al., 2006; Diaz et al., 2006) have indicated that communities of similar total abundance and diversity can be expected to re-colonize dredge sites within several years. In a study off the coast of Panama City, Florida (Saloman et al., 1982), benthic community characteristics, such as species diversity, faunal abundance, and species composition, were equivalent to those of the surrounding communities within 3 months of the sediment disturbance. However, there is uncertainty whether the new benthic communities will fill the same trophic function and provide the same energy transfer to higher trophic levels, as did the original communities (Michel et al., 2007).

Regional research has noted significant seasonal and inter-annual variations in species richness and abundance at shoals and reference sites in the Mid-Atlantic Bight (Slacum et al., 2006). A study, sponsored by the Minerals Management Service, investigated impacts of sand dredging on benthos of the southwest Florida shallow continental shelf. At the Egmont Key study site, benthos were collected before, during, and after dredging activities at three stations (two dredged and one control). Post-dredging sampling occurred at 9 months and 17 months following completion of dredging. Statistical analyses demonstrated that each of the three stations experienced different temporal patterns in benthic community composition. The two dredged stations showed more temporal variation from one another than the control station. However, it was not possible to establish that the differences between the benthic community in the control stations and the dredged stations were due solely to dredging disturbances (Blake at al, 1995). In some instances, the natural variability may be larger than any influence of dredging, especially in physically-dominated environments.

Finfish species could potentially be harmed at the borrow area by entrainment in the dredge. But the extent of the impact may depend on seasonal and daily conditions, as recent research as shown that pelagic fish use such habitat differently between day and night (Slacum et al., 2006). Adult pelagic species, such as bluefish and Atlantic butterfish, should be able to avoid the entrainment into the dredge due to their high mobility. Demersal species, such as the windowpane flounder and the summer flounder, are mobile and should be able to avoid dredge entrainment as well. However, because of their demersal nature, individuals that remain on the seafloor of the borrow area during dredging, could be entrained and destroyed; demersal eggs may be entrained as well. Juveniles are likely more vulnerable than adults due to their slower swimming speed. Finfish species that have eggs and larvae in surface waters may be impacted by the hopper dredge making numerous transits through the borrow area; any eggs in the path of the dredge are likely to be destroyed by the ship's propeller. Because eggs and larvae are widely distributed over the continental shelf, egg destruction is not expected to cause significant impacts to fish populations. While some individual finfish will likely be entrained into the dredge and destroyed, no detrimental impacts to populations of any finfish are expected from the proposed project. Dredging may also result in physical alterations to the substrate of EFH which could result in unsuitable substrate for spawning of some finfish species. However, significant changes in substrate are not expected because dredging cut depths would be based on vibracore data to minimize dissimilar substrates (MMS, 2006).

Finfish and benthic species could also be harmed in the surf zone and foreshore while sand is being pumped onto the beach. The project shoreline is 27,815 linear feet (5.26 miles, 4.57 nautical miles) in length. Approximately 80 acres of shallow water or surf zone habitat will be impacted through the placement of the borrow material along the shoreline during beach nourishment operations. Characteristic of high-energy beaches, benthic communities exhibit low species diversity and are typically highly adapative. Typical benthic communities in the nearshore habitat of Sandbridge Beach include polychaete worms, bivalve mollusks and amphipod crustaceans. The dominant epibenthos are blue mussel (*Mytilus edulis*), common squid (*Loligo pealei*), hermit crab (*Paragus longicarpus*), windowpane flounder *(Scopthalmus aquosus*) and spotted hake (*Urophycis regia*).The majority of fish living nearshore are motile and can easily escape from sand placement. For many shellfish and other invertebrates it would be more difficult. The greatest impacts of sand placement are the initial decrease in fish abundance, potential for gill clogging caused by increased turbidity and direct burial of demersal fish. These impacts would be short-term and localized, and they would not cause significant impacts to populations of any finfish. In July 2001, the USACE ERDC released results of an $8.6 million dollar, eight year biological monitoring program of beach nourishment activities at the Asbury Park to Manasquan Inlet Beach Erosion Control Project in New Jersey (Burlas et al., 2001). Primary findings included: 1) no long-term and systematic impacts to surf zone finfish distribution and abundance patterns; 2) there was no sustained biological indicator (i.e., fish abundance or distribution pattern that distinguished nourished from non-nourished beach habitat); and 3) bluefish were essentially absent during nourishment, while benthic feeders (silversides and kingfish) were potentially attracted to the nourishment area, either related to re-suspended benthic material (silversides) or the general nourished condition (kingfish). Feeding habits of benthic-feeding surf zone fish were also examined, including northern kingfish, rough silverside, and Atlantic silverside. They found that the percentage of fish with filled stomachs did not differ, nor did the relative composition of prey items. Finally, the study also investigated the effects to surf zone and nearshore ichthyoplankton. Comparisons of reference and control beaches revealed no obvious differences in surf zone ichthyoplankton abundance, size and species composition.

The sandbar shark (*Charcharinus plumbeus*), is designated as having a Habitat Area of Particular Concern (HAPC), which is described in regulations as a subset of EFH that is rare; particularly susceptible to human-induced degradation, especially ecologically important; or located in an environmentally-stressed area. There may be an increase in turbidity and sedimentation associated with dredging and sand placement, but the adverse impacts of such changes will be localized and temporary. It is generally viewed that elevated levels of turbidity generated by trailing suction hopper dredge operations in open ocean waters does not represent a significant ecological impact (W.F. Baird & Associates and Research Planning, 2004). Given their mobility, sharks can avoid turbidity plumes and, if necessary, survive short-term elevated turbidity. The beach nourishment area (surf zone) and borrow area are not located within nursery or pupping grounds for the Sandbar Shark. Given that the shark can be found from the intertidal zone to waters more than 655 feet deep and are widely distributed along the East Coast, the borrow area represents a fraction of available forage habitat.

As discussed and evaluated in this Assessment and in the accompanying EA, offshore dredging, dredge transit, and placement along the Sandbridge Beach shoreline are not expected to impact "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" to any appreciable extent over a significantly large area or over any significant period of time. Impacts would be limited and short-lived. Also, HAPC for the sandbar shark is not anticipated to be impacted by the project in any of the following ways: 1) the importance its ecological function, 2) by human-induced or long-term degradation, 3) by stressing the habitat type, or 4) by compromising or jeopardizing the habitat, fully considering the rarity of habitat type. From a finfish perspective, demersal species will be most impacted. The other pelagic species should only be minimally impacted. Given the relatively small-size of the impacted area relative to the large geographic ranges of transitory fishes, the proposed activities, even when considered cumulatively under present conditions, would have only minor impacts on the populations of finfish evaluated in this analysis.

Accordingly, USACE and MMS have determined that the proposed project may have adverse effects on EFH for Federally managed species, but adverse effects on EFH species, due to construction, will largely be temporary and localized within the dredged footprints and beach nourishment areas in the surf zone. In conclusion, the project is not anticipated to significantly impact EFH species or habitat (including HAPC) that may be in the project area.

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<u>Appendix C</u> - Correspondence & Coordination Letters

DEPARTMENT OF THE ARMY
NORFOLK DISTRICT, CORPS OF ENGINEERS
FORT NORFOLK, 803 FRONT STREET
NORFOLK, VIRGINIA 23510-1096

REPLY TO
ATTENTION OF

December 11, 2007

Planning and Policy Branch

See List of Addressees

Dear Sir/Madam:

The Norfolk District Corps of Engineers is reviewing and preparing an updated Environmental Assessment for the Sandbridge Beach Erosion and Hurricane Protection Project, which is located in Virginia Beach, Virginia. The Project was authorized by Section 1(a) of the Water Resources Development Act of 1974 (Public Law 93-251, 93rd Congress, H.R. 10203, 7 March 1974). In March 1992, The U.S. Army Corps of Engineers (USACE) completed the original Final Feasibility Report and Environmental Assessment for Sandbridge, and beach nourishment began in 1998. The current effort will evaluate whether or not the proposed action has the potential for creating significant impacts to the environment and address any changes that may have occurred since the 1992 Environmental Assessment was prepared. The evaluations are based on Federal, state, and local statutory requirements and an assessment of USACE environmental, engineering, and economic regulations.

The proposed action would involve beach nourishment at the Sandbridge oceanfront, an area approximately 5 miles long and 125 feet wide. The specific beach area covered is between Virginia Beach south of the U.S. Naval Fleet Anti-Air Warfare Training Center at Dam Neck, and North of the Back Bay National Wildlife Refuge. The designated borrow site is Sandbridge Shoal, located approximately 3 nautical miles from the shoreline outside of Virginia's territorial sea. Approximately 1.5 million cubic yards of beach quality sand would be placed on a bi-annual cycle depending upon weather conditions, availability of funding, and behavior of subsequently placed material at the project site.

I am interested in the occurrence of any significant environmental resources under your purview within the project area. Any information you could provide would be helpful in our assessment of potential environmental effects. Any other comments or concerns you may have in regard to this project would be appreciated.

If you have any questions, please contact Elisabeth Sears of my office at (757) 201-7766, or email her at elisabeth.j.sears@usace.army.mil) or Craig Seltzer at (757) 201-7390, or email him at craig.l.seltzer@usace.army.mil. Thank you for your time, and we look forward to hearing from you.

Sincerely,

Mark T. Mansfield

Mark T. Mansfield
Chief, Planning and Policy Branch

LIST OF ADDRESSEES

Mary Colligan
National Marine Fisheries Service
Protected Resources Division
Northeast Regional Office
One Blackburn Drive
Gloucester MA 01930-2298

Ms. Karen Mayne
U.S. Fish and Wildlife Service
6669 Short Lane
Gloucester, VA 23061

Mr. Joe Hassell
Environmental Programs Manager
Division of Water Resources
Virginia Department of Environmental Quality
629 East Main Street, 8th Floor
Richmond, VA 23219

Mr. Robert Grabb
Habitat Management Division
Virginia Marine Resources Commission
2600 Washington Ave., 3rd Floor
Newport News, VA 23607

Shawn E. Smith
Principal Planner
Chesapeake Bay Local Assistance Board
101 N. 14th Street, 17th Floor
Richmond, VA 23219

Mr. Raymond T. Fernald
Virginia Department of Game and Inland Fisheries
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Richmond, VA 23230

National Marine Fisheries Service
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One Blackburn Drive
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Mr. Bert Parolari
Virginia Water Protection Program Manager
Tidewater Regional Office
VA Dept of Environmental Quality
5636 Southern Boulevard
Virginia Beach, VA 23462

Mr. David O'Brien
Center For Coastal Resource Management
Virginia Institute of Marine Science
P.O. Box 1346
Gloucester Point, VA 23062-1346

Minerals Management Service

DEPARTMENT OF THE ARMY
NORFOLK DISTRICT, CORPS OF ENGINEERS
FORT NORFOLK, 803 FRONT STREET
NORFOLK, VIRGINIA 23510-1096

REPLY TO
ATTENTION OF:

March 4, 2008

Planning and Policy Branch

Ms. Renee Orr
Chief, Sand and Gravel Program
Minerals Management Service
381 Elden Street, Mail Stop 4010
Herndon, VA 22071

Dear Ms. Orr:

The U.S. Army Corps of Engineers, Norfolk District, is preparing an updated Environmental Assessment for the Sandbridge Beach Erosion and Hurricane Protection Project, located in Virginia Beach, Virginia. The proposed action would involve beach nourishment of the oceanfront, an area approximately 5 miles long and 125 feet wide. The designated borrow site is Sandbridge Shoal, located approximately 3 nautical miles from the shoreline, outside of Virginia's territorial sea. Approximately 1.5 million cubic yards of beach quality sand would be dredged from the shoal on a bi-annual cycle. We intend to seek a Memorandum of Agreement (MOA) from the Minerals Management Service (MMS) for such sand removal.

Pursuant to 40 CFR 1501, the Norfolk District requests the participation of the MMS as a cooperating agency during the required National Environmental Policy Act (NEPA) process. The purpose of this request is to designate the Corps as a lead agency and MMS as a cooperating agency. The Norfolk District will arrange a meeting to establish roles and responsibilities including information acquisition and analyses, specialized expertise, scope of contributions, and establish other appropriate elements of our working relationship for the EA. It is not anticipated that this arrangement will include financial contributions from the Norfolk District. MMS would use their own funds to accomplish these responsibilities. Pursuant to 50 CFR 402, Norfolk District will notify the U.S. Fish and Wildlife Service and NOAA National Marine Fisheries Service of its lead role and MMS' cooperating role, provided that you are in agreement with this arrangement. While it is MMS' policy to negotiate a new MOA per nourishment event (for use of outer continental shelf sand), we would like to discuss the option of negotiating a continuing MOA provided there are no major changes in the project footprint.

Please advise us, at your earliest convenience, as to your agency's willingness to serve as a cooperating agency in the NEPA process for the Sandbridge Beach Erosion and Hurricane Protection Project. If you have any questions or information regarding this project, please contact Elisabeth Sears at (757) 201-7766 or email to elisabeth.j.sears@usace.army.mil. Thank you for your time and we look forward to hearing from you.

Sincerely,

Mark T. Mansfield
Chief, Planning and Policy Branch

United States Department of the Interior

MINERALS MANAGEMENT SERVICE
Washington, DC 20240

Mr. Mark T. Mansfield
Chief, Planning and Policy Branch
Department of the Army
Corps of Engineers, Norfolk District
803 Front Street
Norfolk, Virginia 23510

MAR 2 1 2008

Dear Mr. Mansfield:

Thank you for your March 4, 2008, letter requesting that the Minerals Management Service (MMS) become a cooperating agency during the required National Environment Act (NEPA) process for the Sandbridge Beach Erosion and Hurricane Protection Project. The MMS welcomes the opportunity to participate in the NEPA effort and agrees to serve as a cooperating agency. As a cooperating agency we expect to: participate in the NEPA process at the earliest possible time; participate in the scoping process; assume, on the request of U.S. Army of Corps of Engineers (USACE), responsibility for developing information and preparing environmental analyses for which the MMS has special expertise; make available staff support at the lead agency's request to enhance the interdisciplinary capability of the USACE; and use our own funds to accomplish these responsibilities.

The MMS also agrees to participate in: the required Endangered Species Act (ESA) Section 7 consultation; the Magnuson-Stevens Fishery and Conservation Management Act Essential Fish Habitat consultation (Section 305); the National Historic Preservation Act Section 106 process; and the Coastal Zone Management Act Section 307 consistency determination. As the lead federal agency for ESA Section 7 and the Essential Fish Habitat consultations, the USACE must notify U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) of its lead role and MMS' cooperating role. We would expect to jointly submit with the USACE the ESA Section 7 and Essential Fish Habitat assessments to FWS and NMFS, and/or expect the USACE, as lead agency, to work with the MMS to ensure existing biological opinions from FWS and NMFS are applicable to MMS' part of the Federal action.

The USACE proposed plan requires approximately 1.5 million cubic yards of borrow material from Sandbridge Shoal be dredged on a bi-annual cycle over the remaining life of the 50-year project. The sand would be used for beach nourishment of the oceanfront, an area about 5 miles long and 125 feet wide. It is MMS policy to negotiate a new agreement for each use of OCS material (or per nourishment event); therefore, this agreement only applies to the NEPA and environmental requirements for this maintenance cycle. The final NEPA document, as well as the outcome of the other environmental requirements, may be used to establish stipulations or conditions in a future negotiated agreement. The MMS looks forward to working with you during this process. We ask that the following staff be included on all communication regarding this project, Geoffrey Wikel, Leasing Division, (703) 787-1283 and Sally Valdes, Environmental Division, (703) 787-1707. If you would like to discuss any of these items further, please contact Sally Valdes at (703) 787-1707.

Sincerely,

James F. Bennett
Chief, Branch of Environmental Assessment
Environmental Division

cc: Ms. Elisabeth Sears, Norfolk District, Corps of Engineers
Department of the Army
Corps of Engineers, Norfolk District
803 Front Street
Norfolk, Virginia 23510

Virginia Department of Historic Resources

May 12, 2008

Planning and Policy Branch

Ms. Joanna Wilson
Office of Review and Compliance
Department of Historic Resources
2801 Kensington Avenue
Richmond, Virginia 23221

Dear Ms. Wilson:

The Norfolk District Corps of Engineers is currently the planning next cycle of beach nourishment for the Sandbridge shoreline in Virginia Beach, VA. This project was initially constructed in 1998 under the authorization of Section 1(a) of the Water Resources Development Act of 1974. This shoreline has been renourished several times since initial construction, most recently in 2007.

The proposed action will involve placement of about 1.5 million cubic yards of beach quality sand along a stretch of eroding oceanfront approximately 5 miles long and 125 feet wide. The specific beach area covered is located between the U.S. Naval Fleet Anti-Air Warfare Training Center at Dam Neck and the Back Bay National Wildlife Refuge (see Figure 1). The proposed site for the borrow material is Sandbridge Shoal, which is located approximately three nautical miles from the shoreline, outside of Virginia's territorial waters. Within the shoal are two specific areas proposed for borrow material: Area B to the north and Area A to the south (see Figure 2). The area in between these two areas is not suitable because it is the location of a buried Navy communications cable. Either a hydraulic cutterhead suction dredge or a trailing suction hopper dredge would be used to remove the material from the borrow site and then pump it along the beach.

Several remote sensing surveys have been carried out in connection with previous beach nourishment projects at Sandbridge. Earlier, Christopher Goodwin and Associates carried out a literature search and remote sensing survey of portions of Areas A and B for the Navy's beach nourishment project at Dam Neck, resulting in a recommendation of no further work for the six anomalies discovered in that survey. In 1998, Tidewater Atlantic Research (TAR) carried out a remote sensing survey of part of Area B, which resulted in a recommendation of no additional investigation. In 2006, TAR carried out a remote sensing survey of Area A and the part of Area B that was not previously surveyed. This survey resulted in the identification of 46 anomalies which were judged as requiring additional investigation or otherwise avoided.

There are no known archaeological or architectural sites along the shoreline where the sand will be placed. However, the Little Island Coast Guard Station, a structure of local interest, is located landward of the beach near the Little Island City Park, a city maintained beach facility. This structure was built in 1925 as a U.S. Coast Guard Lifeboat Station, was deactivated in 1964, and is currently used as a maintenance and support facility for the Little Island City Park.

At this point in our study, it appears that there are no known significant resources within the area of potential effect (beach and offshore borrow areas) which will be affected by the proposed action. The dredge will avoid all areas within the borrow areas that contain anomalies of potential historical interest. In accordance with Section 106 of the National Historic Preservation Act, we are requesting concurrence with our determination of no effect on historic resources by June 15, 2008.

We will be preparing an environmental assessment as part of the National Environmental Policy Act compliance process, and that document will be coordinated later this year with your agency as well as other state, Federal, and local agencies and other interested persons. In the meantime, if you have any questions or concerns about this project, please contact Helene Haluska of my staff at (757) 201-7008.

Sincerely,

Mark T. Mansfield
Chief, Planning and Policy Branch

Enclosures

COMMONWEALTH *of* VIRGINIA

L. Preston Bryant, Jr.
Secretary of Natural Resources

Department of Historic Resources
2801 Kensington Avenue, Richmond, Virginia 23221-0311

Kathleen S. Kilpatrick
Director

Tel: (804) 367-2323
Fax: (804) 367-2391
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www.dhr.virginia.gov

May 15, 2008

Ms. Helene Haluska
Planning and Policy Branch
US Army Corps of Engineers, Norfolk District
803 Front Street
Norfolk, VA 23510

Re: Offshore Borrow and Beach Nourishment Areas, Sandbridge Beach
DHR File # 2007-0458

Dear Ms. Haluska:

We have received a notice of intent to complete an environmental assessment for the above referenced project. As the notice states, archaeological survey of the proposed borrow areas identified multiple sonar and magnetic targets, some of which were recommended for avoidance or further investigation if they could not be avoided by dredging activities. We understand that the proposed dredging for beach nourishment purposes will avoid these anomalies, but your letter does not provide information regarding how that avoidance will be accomplished. Please provide this information at your earliest convenience so that we may better understand the scope of the undertaking. As well, a search of our archives indicates that we have no information about the Little Island Coast Guard Station. Please provide photographs of this property and information regarding how the beach nourishment activity may affect it. We will complete our review upon receipt of this information.

If you have any questions about our comments or the Section 106 process, please call me at (804) 367-2323, Ext. 140.

Sincerely,

Joanna Wilson, Archaeologist
Office of Review and Compliance

Administrative Services
10 Courthouse Avenue
Petersburg, VA 23803
Tel: (804) 863-1624
Fax: (804) 862-6196

Capital Region Office
2801 Kensington Ave.
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Fax: (540) 857-7588

Northern Region Office
5357 Main Street
PO Box 519
Stephens City, VA 22655
Tel: (540) 868-7031
Fax: (540) 868-7033

June 19, 2008

Planning and Policy Branch

Ms. Joanna Wilson
Office of Review and Compliance
Department of Historic Resources
2801 Kensington Avenue
Richmond, Virginia 23221

Dear Ms. Wilson:

Thank you for your letter of May 15, 2008 regarding the beach nourishment project at Sandbridge Beach in Virginia Beach (DHR File # 2007-0458). The letter requested additional information concerning two features of the project. The first item concerned the planned avoidance of the anomalies that were identified during the remote sensing survey. The anomalies will be avoided by establishing a buffer of at least 200 feet (radius) around the target coordinates. This restriction will be placed in the plans and specifications that are prepared for the construction contract.

The second item requested pictures of the Little Island Coast Guard Station and information on potential impacts to the structure. Enclosed are five pictures of various views of the former lifesaving station. Since maintenance dredging was recently completed in the fall of 2007, the view of the Coast Guard Station from the shoreline, as shown in Photo 5, is likely very similar to the expected appearance of the area after completion of the next maintenance dredging, which is currently estimated to occur in the summer of 2010. No effect on the Coast Guard Station is expected as a result of the next dredging and beach nourishment because of the distance of the Coast Guard Station from the actual area where sand will be placed and the fact that the Station is located behind the existing dune line. All the construction activities will take place to the east of the existing dune line well beyond the building.

We hope this information will assist you in completing your review of the proposed project. If you have any questions or concerns about this project, please contact Helene Haluska of my staff at (757) 201-7008.

Sincerely,

Mark T. Mansfield
Chief, Planning and Policy Branch

Enclosures

COMMONWEALTH *of* VIRGINIA

L. Preston Bryant, Jr.
Secretary of Natural Resources

Department of Historic Resources
2801 Kensington Avenue, Richmond, Virginia 23221-0311

Kathleen S. Kilpatrick
Director

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July 17, 2008

Ms. Helene Haluska
Planning and Policy Branch
US Army Corps of Engineers, Norfolk District
803 Front Street
Norfolk, VA 23510

Re: Offshore Borrow and Beach Nourishment Areas, Sandbridge Beach
DHR File # 2007-0458

Dear Ms. Haluska:

We have received the additional information requested, and appreciate your providing this data for our review. With the understanding that all anomalies will be avoided, and with the understanding that the Coast Guard Station is located away from the proposed nourishment area, we are of the opinion that the project will not adversely affect historic properties.

If you have any questions about our comments or the Section 106 process, please call me at (804) 367-2323, Ext. 140.

Sincerely,

Joanna Wilson, Archaeologist
Office of Review and Compliance

Administrative Services
10 Courthouse Avenue
Petersburg, VA 23803
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Capital Region Office
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Northern Region Office
5357 Main Street
PO Box 519
Stephens City, VA 22655
Tel: (540) 868-7031
Fax: (540) 868-7033

From: Grayson, Ron [mailto:Ron.Grayson@dhr.virginia.gov]
Sent: Thursday, February 05, 2009 9:51 AM
To: Wikel, Geoffrey L
Subject: RE: Section 106 Process for Sandbridge Beach Hurricane Protection and Storm Damage Reduction Project

Geoffrey:

Thank you for this information. We will indicate that the Corps is the Lead Federal Agency for Section 106 on the project.

Ron

From: Wikel, Geoffrey L [mailto:Geoffrey.Wikel@mms.gov]
Sent: Tuesday, February 03, 2009 3:40 PM
To: Grayson, Ron
Cc: Stright, Melanie; Sears, Elisabeth J. NAO; Helene.Haluska@usace.army.mil
Subject: Section 106 Process for Sandbridge Beach Hurricane Protection and Storm Damage Reduction Project

Hi Ron,
The Minerals Management Service (MMS) is notifying the Virginia Department of Historical Resources (DHR) of our involvement in the Sandbridge Beach Hurricane Protection and Storm Damage Reduction Project. The MMS has jurisdiction over the development of mineral and alternative energy resources on the Federal Outer Continental Shelf (OCS). The MMS was invited by the U.S. Army Corps of Engineers (USACE), the lead federal agency, to participate as a cooperating agency in the preparation of an Environmental Assessment under the National Environmental Policy Act, since the proposed project involves the use of OCS sand from Sandbridge Shoal. The MMS also agreed to participate in the National Historic Preservation Act (NHPA) section 106 process. Per 36 CFR 800.2(2), the MMS requested that the Corps of Engineers serve as the lead federal agency for section 106 compliance with MMS acting in a consulting role. The Corps did not notify DHR of their lead role and our involvement in the proposed action or their intention to fulfill collective responsibilities under section 106. Please find the section 106 correspondence between the Corps and DHR attached. The MMS would appreciate an email response acknowledging the same. If you have any questions or require additional information, please feel free to contact me, or our Historic Preservation Officer, Melanie Stright, at Melanie.Stright@mms.gov. I appreciate your cooperation and assistance in this matter.

Geoffrey Wikel
Environmental Division Minerals Management Service
381 Elden Street, MS 4042
Herndon, VA 20170
(703) 787-1283 Geoffrey.Wikel@mms.gov www.mms.gov

U.S. Fish and Wildlife Service
and
Virginia Department of Game and Inland Fisheries

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
6669 Short Lane
Gloucester, VA 23061

January 3, 2008

Colonel Dionysios Annios
District Engineer
Norfolk District, Corps of Engineers
Fort Norfolk, 803 Front Street
Norfolk, Virginia 23510-1096

Attn: Elisabeth Sears
Planning Branch

Re: Sandbridge Beach Erosion and
Hurricane Protection Project
Norfolk, Virginia

Dear Colonel Annios:

The U.S. Fish and Wildlife Service (Service) has reviewed your December 11, 2007 request for information on federally listed species that occur around the Sandbridge Beach Erosion and Hurricane Protection project area. The Service provides the following information in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat.401, as amended; 16 U.S.C. 661 *et seq.*) and Section 7 of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*).

You are updating the Environmental Assessment for the Sandbridge Beach Erosion and Hurricane Protection Project in Virginia Beach, Virginia. The study proposes to nourish an area of the Sandbridge oceanfront approximately 5 miles long and 125 feet wide. The specific beach nourishment area is between Virginia Beach, south of the U.S. Naval Fleet Anti-Air Warfare Training Center at Dam Neck, and north of the Back Bay National Wildlife Refuge. The borrow area identified as a potential sand source is Sandbridge Shoals. Approximately 1.5 million cubic yards would be place on a bi-annual cycle, depending on weather conditions, funding, and need. There are recorded observations of the loggerhead sea turtle (*Caretta caretta*), federally listed threatened, and they nest along the entire stretch of beach identified for nourishment in this project. A record of a roseate tern (*Sterna dougallii dougallii*), federally listed endangered was recorded at the southern end of the stretch of beach.

The Service will continue to coordinate with you on this project. Our planning aid report and coordination act report will provide detailed comments and descriptions of the potentially affected species. We also recommend you coordinate with the Virginia Department of Game and Inland Fisheries and NOAA Fisheries regarding species under their purview. We thank you for the opportunity to coordinate with you. Please contact Sumalee Hoskin of this office at (804) 693-6694 extension 136 if you have questions or to discuss the project further.

Sincerely,

Karen L. Mayne

Karen Mayne
Supervisor
Virginia Field Office

DEPARTMENT OF THE ARMY
NORFOLK DISTRICT, CORPS OF ENGINEERS
FORT NORFOLK, 803 FRONT STREET
NORFOLK, VIRGINIA 23510-1096

REPLY TO
ATTENTION OF:

June 19, 2008

Planning and Policy Branch

Ms. Sumalee Hoskin
U.S. Fish and Wildlife Service
Virginia Field Office
6669 Short Lane
Gloucester, VA 23061

Dear Ms. Hoskin:

The U.S. Army Corps of Engineers, Norfolk District, is proposing beach nourishment at the Sandbridge oceanfront to occur within the next two years. The Norfolk District, acting as a lead agency, and the Minerals Management Service, acting as a joint agency, are currently updating the Environmental Assessment (EA) to evaluate whether or not the proposed action has the potential for creating significant impacts to the environment and address any changes that may have occurred since the previous EA was prepared in 1992. The proposed action would involve beach nourishment along an area approximately 5 miles long and 125 feet wide. The specific beach area covered is between Virginia Beach south of the U.S. Naval Fleet Anti-Air Warfare Training Center at Dam Neck and North of the Back Bay National Wildlife Refuge (Figure 1). The designated borrow site is Sandbridge Shoal, located approximately 3 nautical miles from the shoreline, outside of Virginia's territorial sea. Beach quality sand would be removed by either hydraulic cutterhead suction dredge or by trailing suction hopper dredge. Approximately 1 to 2 million cubic yards of beach quality sand would be placed on the beach on a bi-annual cycle depending upon weather conditions, availability of funding, and behavior of subsequently placed material at the project site. The cycle may occur less often, but probably no less than once every 4 years.

The USFWS Service lists 65 listed threatened and/or endangered species in Virginia. Of those species, the following may occur along the Atlantic Coast of Southern Virginia:

Whales
E- Blue whale *Balaenoptera musculus*
E- Finback whale *Balaenoptera physalus*
E- Humpback whale *Megaptera novaengliae*
E- Right whale *Eubalaena glacialis*
E- Sei whale *Balaenoptera borealis*
E- Sperm whale *Physeter macrocephalus*

Birds
T- Piping plover *Charadrius melodus*
E- Roseate tern *Sterna dougallii dougallii*

Fish
E- Shortnose sturgeon *Acipenser brevirostrum*

Turtles
T- Loggerhead sea turtle *Caretta caretta*
T- Green sea turtle *Chelonia mydas*
E- Leatherback sea turtle *Dermochelys coriacea*
E- Hawksbill sea turtle Eretmochelys imbricata
E- Kemp's ridley sea turtle *Lepidochelys kempii*

Plants
T- Seabeach amaranth *Amaranthus pumilus*

Of the listed species, only the sea turtles, right whale, humpback whale and finback whale may be potentially affected by this action. A review of the listed shortnose sturgeon, piping plover, roseate tern and seabeach amaranth indicated a low likelihood of occurrence within the project area however; their proximity to Sandbridge Beach warranted continued consideration in the updated draft Environmental Assessment.

On April 2, 1993, the National Marine Fisheries Service (NMFS) issued a Biological Opinion (BO) for borrow area dredging and transport to Sandbridge Beach. Due to funding delays, the project was not completed until 1998, at which time the reasonable and prudent measures and terms and conditions outlined in the 1993 BO were incorporated into the current project specifications. The Incidental Take Statement (ITS) was updated in 2001 following new information on sea turtles resuscitation, hopper dredge interactions and reporting requirements. Recent coordination with the NMFS on December 2007, concluded that the current ITS and BO remain valid for the upcoming dredging and beach nourishment operations provided Norfolk District adhere to all reasonable and prudent measures and terms and conditions as outlined in the 2001 ITS and 1993 BO.

The Norfolk District will adhere to all terms and conditions and reasonable and prudent measures established during the course of previous Section 7 consultation with your office and the NMFS. If dredging occurs between May 1 and November 30, with the use of a hopper dredge, turtle deflectors will be outfitted on the draghead and trained turtle observers would be onboard during this time. Additionally, between May 1 and November 30, only sections of the beach undergoing re-nourishment will be monitored for sea turtles, their nests and nesting activities. Because of these conditions, it is recognized that the proposed beach re-nourishment is not likely to adversely affect sea turtles. The Norfolk District will employ trained personnel to conduct this monitoring consistent to our agreement. Under current project planning scenarios, these efforts will be continued into future nourishment cycles to fulfill our requirements under the Endangered Species Act. In November 2002, your office issued a letter stating that the project is not likely adversely affect sea turtles if qualified personnel conduct the monitoring.

Based on this information, the Norfolk District finds that the proposed activity would not adversely affect any listed threatened and/or endangered species. Under Section 7 coordination of the Endangered Species Act, the Norfolk District requests your concurrence with the determination for dredging at Sandbridge Shoal and beach nourishment at Sandbridge Beach.

Should you require any further assistance, please call Elisabeth Sears at (757) 201-7766 or email to: elisabeth.j.sears@usace.army.mil. Thank you for your time and we look forward to hearing from you.

Sincerely,

Mark T. Mansfield

Mark T. Mansfield
Chief, Planning and Policy Branch

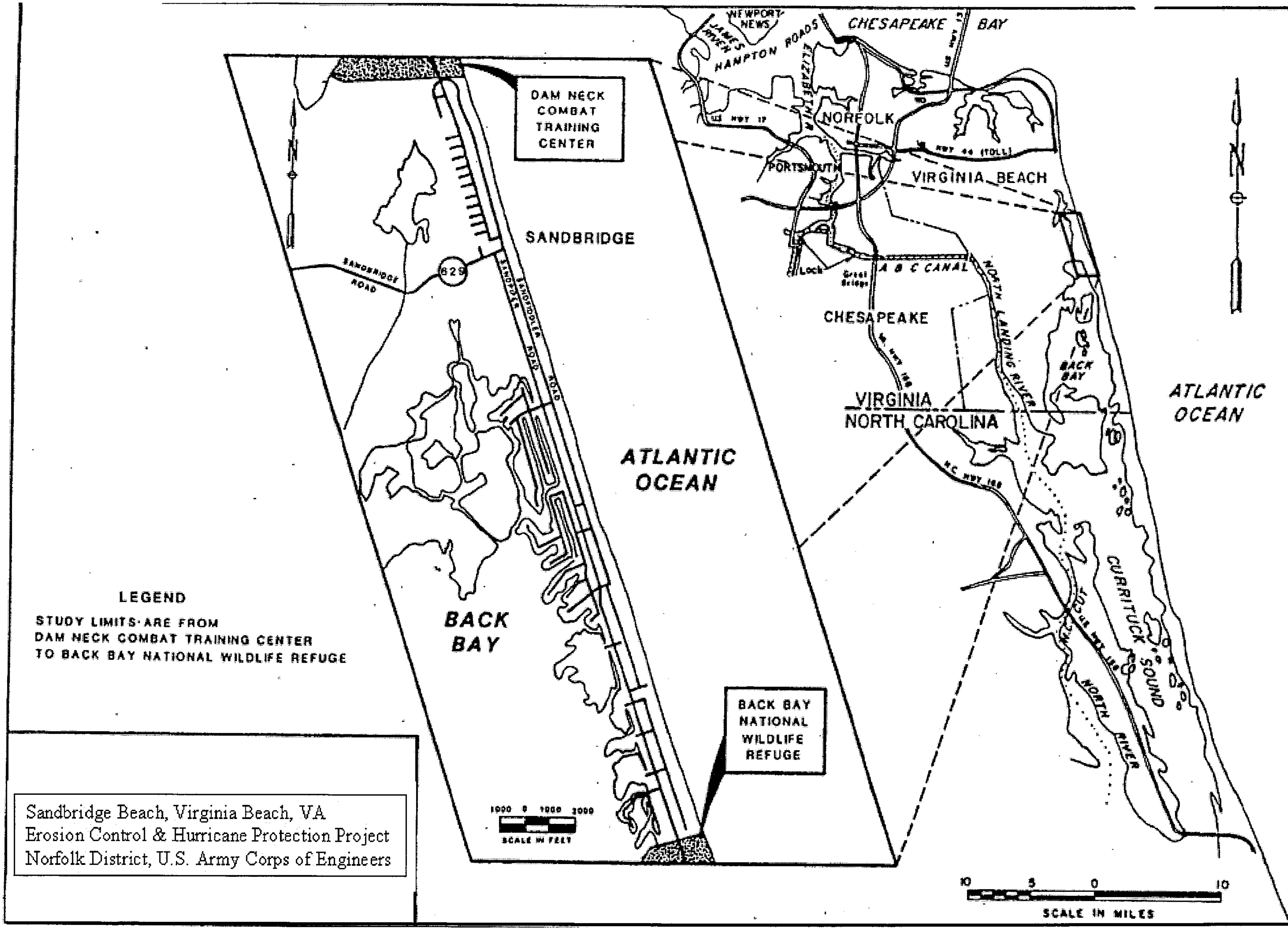

PLATE C-1

Figure 1

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
6669 Short Lane
Gloucester, VA 23061

October 10, 2008

Colonel Dionysios Anninos
District Engineer
Norfolk District, Corps of Engineers
Fort Norfolk, 803 Front Street
Norfolk, Virginia 23510-1096

Attn: Ms. Elisabeth Sears

Re: Sandbridge Proposed Beach Nourishment Project, Virginia Beach, Virginia, Project # 2008-I-0649

Dear Colonel Anninos:

We have received your request for concurrence on your determination, made under the authority of the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*). You have determined that the above referenced project is not likely to adversely affect the endangered green sea turtle (*Chelonia mydias*), hawksbill sea turtle (*Eretmochelys imbricate*), Kemp's ridley sea turtle (*Lepidochelys kempi*), leatherback sea turtle (*Dermochelys coriacea*) shortnose sturgeon (*Acipenser brevirostrum*), and roseate tern (*Sterna dougallii dougallii*), and the threatened loggerhead sea turtle (*Caretta caretta),* piping plover (*Charadrius melodus*), and seabeach amaranth (*Amaranthus pumilus*). The Service has reviewed information on federally listed and proposed endangered and threatened species and designated critical habitat and provides the following comments under provisions of the.

The U.S. Army Corps of Engineers proposes to conduct beach nourishment activities along the Sandbridge oceanfront over the next four years. You plan to dredge beach quality sand from Sandbridge Shoal and nourish an area approximately 5 miles long and 125 wide. Approximately 1 to 2 million cubic yards will be placed on the beach on a bi-annual basis.

Most sea turtles in the Virginia Beach/Sandbridge area are loggerhead sea turtles, but this consultation addresses all sea turtles that could potentially be in the area: green, hawksbill, Kemp's ridley, and leatherback. As stated in your June 19, 2008, letter you have coordinated with the National Marine Fisheries Service regarding your dredging activities and agree to adhere to the previsions stated in our November 2002 letter. Specifically, you agree to use qualified personnel to monitor for sea turtle activities and nests on the sections of beach undergoing nourishment. During actual beach nourishment activities, you will have trained personnel on-site with instructions to cease activities and to contact the Service if a sea turtle attempts to nest. If nesting occurs, project activities will be modified to avoid potential impacts to turtles.

Transient listed species that travel through the area and may occasionally occur in the vicinity of the project area include the piping plover, roseate tern, and shortnose sturgeon. The piping plover is an uncommon summer resident in the lower Chesapeake Bay. They breed and forage along the barrier islands and bays on the Atlantic coast in Virginia from March to October. They have not been documented within the project area. Migrating plovers from across the northeast also pass through the area during spring and fall migration. The roseate tern is rare in the area, and may only be in the coastal area during the summer. Historically it nested on the Eastern Shore but nesting has not been documented there since 1927. The shortnose sturgeon was reported in the Potomac River in January 2006, and it is believed to have passed through the Chesapeake Bay in order to reach the Potomac. The Service believes the project may have a temporary, small effect on a small portion of the potential habitat of these transient species. During construction, the Service expects that any individuals of these species in the area immediately adjacent to the project would move to other areas. No long-term negative impacts to habitat for these species are anticipated. These effects are expected to be insignificant and discountable.

The seabeach amaranth is unlikely to occur in the project area, and has never been recorded at the site. Historically, seabeach amaranth was native to Atlantic coast barrier island beaches from Massachusetts to South Carolina, and may have occurred on the project area. The species' primary habitat consists of overwash flats at accreting ends of barrier islands, and lower foredunes and upper strands of non-eroding beaches. Because the species is not known to occur in the project area, impacts from construction are not expected to occur. The proposed project is not expected to have any long-term negative effects to habitat in the project area.

If the previously mentioned protective measures for sea turtles are followed, the Service believes the proposed action is not likely to adversely affect federally listed or proposed species or designated critical habitat. Should project plans change or if additional information on listed and proposed species becomes available, this determination may be reconsidered. If you have any questions or need further assistance, please contact Sumalee Hoskin of this office at (804) 693-6694, extension 136.

Sincerely,

Susan Lingenfelser

Susan Lingenfelser
Acting Supervisor
Virginia Field Office

cc: FWS, BBNWR (John Gallegos)
NOAA Fisheries, Gloucester, VA (David O'Brien)
NOAA Fisheries, Gloucester, MA
VDGIF, Painter, VA (Ruth Boettcher)

Sears, Elisabeth J. NAO

From:	Amy.Ewing@dgif.virginia.gov
Sent:	Tuesday, February 19, 2008 5:17 PM
To:	Sears, Elisabeth J. NAO
Cc:	John.Kleopfer@dgif.virginia.gov; Ruth.Boettcher@dgif.virginia.gov; Jeff.Cooper@dgif.virginia.gov
Subject:	ESSLog# 21667_update to EA_Sandbridge Beach Erosion and Hurricane Protection Project

In response to your letter of request for information for inclusion in an updated Environmental Assessment (EA) for the subject project, we offer the following comments and recommendations:

According to our records, federal Endangered roseate tern, federal Endangered Kemp's Ridley sea turtle, state Threatened eastern glass lizard and state Threatened bald eagle have been documented in the project area.

In terms of impacts associated with the dredging of materials at a site located off the shore of Virginia, northeast of False Cape, we recommend that all reasonable measures are taken to avoid and minimize adverse impacts upon sea turtles. This should include, but not be limited to, use of rigid turtle deflector devices, inflow screening on the dredges and the use of trained observers for locating turtles during dredging operations. We recommend a time of year restriction on hopper dredging from April 1 through November 30 of any year.

With respect to impacts upon sea turtles from the proposed beach nourishment activities, we recommend a time of year restriction on these activities from May 15 through October 31, the peak egg-laying season and egg hatching. We recommend monitoring for sea turtle nesting activities in sections of beach that undergo nourishment activities. Further, we recommend that beach nourishment be performed in such a way as to increase nesting habitat available to sea turtles. This may include leveling any escarpments prior to the nesting season.

To best protect eastern glass lizard, we recommend that beach nourishment not occur during egg-laying and hatching season for this species in areas identified as suitable habitat. Egg-laying usually begins in early June and hatching my not be complete until late October. We recommend that all beach nourishment in areas identified as suitable habitat adhere to a time of year restriction from June 1 through October 31 for the protection of eastern glass lizard.

Roseate tern is not believed to breed in Virginia any longer as the last breeding confirmation was in 1927. However, we recommend that the EA for this project include information related tot he protection of this species and any need for further survey efforts to confirm or deny its presence in the project area.

A bald eagle nest has been documented northeast of False Cape along the South Inlet. This puts the nest approximately 5,000' inland. Therefore, it is unlikely that beach nourishment activities will impact this species. However, we recommend that the EA address possible impacts upon this species.

Further information regarding the protection of shorebirds and sea turtles should be directed to VDGIF's Easter Shore Biologist, Ruth Boettcher, at 757-787-5911 or at Ruth.Boettcher@dgif.virginia.gov.

Further information regarding the protection of eastern glass lizard should be coordinated with John (JD) Kleopfer, VDGIF Region I Wildlife Diversity Biologist/Herpetologist, at 804-829-6580, or at

John.Kleopfer@dgif.virginia.gov.

Further information regarding the protection of bald eagle should be coordinated with Jeff Cooper, VDGIF Region V Wildlife Diversity Biologist, at 540-899-4169, or at Jeff.Cooper@dgif.virginia.gov.

Thank you.

Amy M. Ewing
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries 4010 West Broad Street
Richmond, VA 23230
804-367-2211
amy.ewing@dgif.virginia.gov

DEPARTMENT OF THE ARMY
NORFOLK DISTRICT, CORPS OF ENGINEERS
FORT NORFOLK, 803 FRONT STREET
NORFOLK, VIRGINIA 23510-1096

REPLY TO
ATTENTION OF:

March 4, 2008

Planning and Policy Branch

Ms. Amy M. Ewing
Environmental Services Biologist
Virginia Department of Game and Inland Fisheries
4010 West Broad Street
Richmond, VA 23230

Dear Ms. Ewing:

The U.S. Army Corps of Engineers, Norfolk District, is in receipt of your email dated February 19, 2008. Comments and recommendations received were in reference to the proposed maintenance of the Sandbridge Beach Erosion and Hurricane Protection Project, Virginia Beach, Virginia. The recommendations included the protection of Federally endangered roseate tern, Federally endangered sea turtles, state threatened eastern glass lizard and state threatened bald eagle.

Roseate terns began to decline from its historical range in the late 1800's resulting from human activity, gull competition, and predation. They formerly bred from Nova Scotia to Virginia, but currently no longer breed south of Long Island, NY. The Migratory Bird Treaty Act of 1918 enabled some populations to reestablish and increase, however terns were ultimately extirpated from Maryland and Virginia. No known nests have been documented in Virginia since 1927. The species may visit the project area during the summer months but this occurrence would be rare. Potential impacts related to the roseate tern will be addressed in the updated draft Environmental Assessment, to be released in the near future.

The Norfolk District will adhere to all terms and conditions and reasonable and prudent measures established during the course of previous Section 7 consultation with the U.S. Fish and Wildlife Service and National Marine Fisheries Service. If dredging occurs between May 1 and November 30, with the use of a hopper dredge, turtle deflectors will be outfitted on the draghead and trained turtle observers would be onboard during this time. Additionally, between May 1 and November 30, sections of the beach undergoing re-nourishment will be monitored for sea turtles, their nests and nesting activities. The Norfolk District will employ trained personnel to conduct this monitoring consistent to our agreement with the U.S. Fish and Wildlife Service. With implementation of these measures, no time of year restrictions have been required through previous project coordination. Under current project planning scenarios, these efforts will be continued into future nourishment cycles to fulfill our requirements under the Endangered Species Act. Potential impacts related to sea turtles will be addressed in the updated draft Environmental Assessment.

The Eastern Glass Lizard is a State listed species found in pine flatwoods and around wetlands in sandy habitats. They are most common in Back Bay National Wildlife Refuge and False Cape State Park and unlikely to occur within the project area.

Norfolk District will continue to follow conservation measures to avoid or minimize adverse impacts to bald eagles. Given the indication of a bald eagle nest located approximately 5,000 feet from the project site, the nourishment activities would not disturb the eagle or its nest due to its distance from the project. National Bald Eagle Management Guidelines set forth by the U.S. Fish and Wildlife Service would be considered for any activities that may affect the species.

Additional comments regarding this project may be directed to Elisabeth Sears at: (757) 201-7766 or email to: elisabeth.j.sears@usace.army.mil. Thank you for your involvement in our planning process.

Sincerely,

Craig Seltzer

for Mark T. Mansfield
Chief, Planning and Policy Branch

-----Original Message-----
From: Dorie_Stolley@fws.gov [mailto:Dorie_Stolley@fws.gov]
Sent: Tuesday, March 18, 2008 4:11 PM
To: John_Gallegos@fws.gov
Cc: Sears, Elisabeth J. NAO
Subject: RE: Sandbridge Beach (UNCLASSIFIED)

John (and Elisabeth),
Here is the 2007 sea turtle report for BBNWR. All is well here...but busy!

Dorie
(See attached file: Sea Turtle Annual Report 2007.doc)

Dorie Stolley
Visitor Services Manager
Eastern Shore of Virginia National Wildlife Refuge
5003 Hallett Circle
Cape Charles, VA 23310
Phone: (757) 331-2760

John Gallegos/R5/FWS/DOI
To Dorie Stolley/R5/FWS/DOI
03/18/2008 01:59 PM
Subject RE: Sandbridge Beach (UNCLASSIFIED) (Document link: Dorie Stolley)

Hi Dorie,
Glad to hear that you're settling into your new position.
I don't have an electronic version of the 2007 Sea Turtle Report. I'll bet you've got a copy squirreled away someplace and can send it to me. It has the updated (2000-2007) sea turtle info in it that Elisabeth Sears (below) is looking for. I have a hard copy of the document that provides the graph and table, but not an electronic version. I've got all the other years Reports but 2007's.
Let me know if you can find it or not. Thanks!

John G.
John B. Gallegos, Wildlife Biologist
U.S. Fish & Wildlife Service
Back Bay N.W.R.
4005 Sandpiper Road,
Virginia Beach, VA 23456-4347
E-Mail: John_Gallegos@fws.gov
Phone: (757) 721-2412/3896
Fax: (757) 721-6141
http://backbay.fws.gov

Dorie Stolley/R5/FWS/DOI
To "Sears, Elisabeth J. NAO"<Elisabeth.J.Sears@usace.army.mil>
03/14/2008 10:56AM
cc Ruth.Boettcher@dgif.virginia.gov, John Gallegos/R5/FWS/DOI@FWS
Subject RE: Sandbridge Beach (UNCLASSIFIED) (Document link: John Gallegos)

Elizabeth,

I am forwarding your request on to John Gallegos, since I am no longer at Back Bay NWR.
Ruth, if you have already sent the info to Elizabeth, would you please let John know? Thanks!

Dorie
Dorie Stolley
Visitor Services Manager
Eastern Shore of Virginia National Wildlife Refuge
5003 Hallett Circle
Cape Charles, VA 23310
Phone: (757) 331-2760

"Sears, Elisabeth J. NAO"<Elisabeth.J.Sears@usace.army.mil>
<Dorie_Stolley@fws.gov><Ruth.Boettcher@dgif.virginia.gov>
Subject RE: Sandbridge Beach (UNCLASSIFIED)

Hi again,
We have detailed sea turtle monitoring reports (what I can find) in our office up to the year 2000. I am trying to put together a graph in our updated EA that includes the location and number of each nest and false crawls- just like what you have on page 19 of your activity report and nesting summary years 1980-2000. The attachment is from that report - the format I would like to follow.

I just need to know what has been recorded from 2000-2007 at each site. I would appreciate any help......and if you had those reports.

Thank You!!
Elisabeth S.

-----Original Message-----
From: Lewandowski, Jill [mailto:Jill.Lewandowski@mms.gov]
Sent: Wednesday, March 25, 2009 8:57 AM
To: Lingenfelser, Susan
Cc: Wikel, Geoffrey L; Skrupky, Kimberly A; Sears, Elisabeth J. NAO
Subject: FW: FWS concurrence on Sandbridge project????

Ms. Lingenfelser,

Elisabeth Sears with ACOE recently forwarded me your letter regarding the Section 7 ESA consultation on the Sandbridge project. As you may be aware, MMS is the Federal agency responsible for granting the ACOE authority to dredge and collect sands from Sandbridge Shoals for this beach renourishment project. I notice from your concurrence letter that there is no mention of MMS as a joint agency on this consultation. I just wanted to clarify with you, in writing, as to whether MMS is covered under this consult. We just want to be sure we have our ESA compliance requirements in place. Again, MMS is simply granting the authority to collect sands from the shoal and there is no additional direct or indirect activity which would add to the level of effects to ESA-listed species or designated critical habitat.

Please advise when you can. Thanks for your time and attention.

Thanks,
Jill

Jill Lewandowski
Protected Species Coordinator
Environmental Division
Minerals Management Service
U.S. Department of Interior
381 Elden Street, MS 4042
Herndon, VA 20170
(703) 787-1703
fax (703) 787-1026
email Jill.Lewandowski@mms.gov
Internet www.mms.gov

National Oceanic and Atmospheric Administration
National Marine Fisheries Service

DEPARTMENT OF THE ARMY
NORFOLK DISTRICT, CORPS OF ENGINEERS
FORT NORFOLK, 803 FRONT STREET
NORFOLK, VIRGINIA 23510-1096

REPLY TO
ATTENTION OF

January 31, 2007

Planning and Policy Branch

Ms. Julie Crocker
National Marine Fisheries Service
Northeast Region
One Blackburn Drive
Gloucester, MA 01930-2298

Dear Ms. Crocker,

The Norfolk District Corps of Engineers is currently preparing for the maintenance of a beach nourishment project at Sandbridge Beach, Virginia Beach, Virginia, that is planned to begin in spring 2007. The original Federal beach nourishment at Sandbridge was constructed in 2002 by the Norfolk District. The upcoming project incorporates the same design criteria as the 2002 project, namely a 50-foot-wide berm at an elevation of 6 feet (NGVD) with a foreshore slope of approximately 1:20 for a shoreline distance of approximately 5 miles from the Dam Neck Fleet Training Center to the Back Bay National Wildlife Refuge.

The state permits cover the placement of a total of 3.5 million cubic yards (MCY) of beach quality sand obtained from a borrow source located outside of Virginia's Territorial Sea. This volume of sand supplied the approximately 1.5 MCY necessary for the initial nourishment that was completed in 2002. At the time the permits were processed, two maintenance cycles of one MCY each were tentatively planned for 2004 and 2006. However, due to lack of funding, no nourishment cycle occurred during 2004. Therefore, we anticipate utilizing the remaining volume of the permit (2 MCY) for one nourishment event scheduled for late spring/early fall 2007.

All requirements of the Section 7 consultation with NMFS regarding measures to minimize/eliminate impacts to threatened and endangered species are outlined in correspondence from your agency dated August 20, 2001 and April 6, 2006. In accordance with the terms and conditions of the Biological Opinion (BO) for the Sandbridge Beach project, a turtle observer is required on hopper dredges operating during the period of April 1st through November 30th.

Recent developments indicate the potential to encounter small caliber unexploded ordnance (UXO) in the mid-Atlantic region including the borrow areas for this project. As a safety precaution, the U.S. Army Corps of Engineers is requiring that a screen be placed over the drag head to effectively prevent any of the UXO from entering the hopper and/or being placed on the beach. To be successful it was determined that the screen should be made of vertical metal bars with a gap of no more than 1.5 inches.

This will allow for the sand to pass but retard the UXO. It will also have the added advantage of preventing turtles from being entrained in the drag head.

Since the screen has such a narrow opening, the likelihood of a turtle being entrained is minute to impossible. If something biological was to be captured through the one inch slots it would not be caught in the cages on the dredge since the openings are much larger. Therefore, the cages should be empty and the need for an observer is negated. Based on your recent correspondence with the Corps Baltimore District (August 30, 2006), the Norfolk District is requesting that your office remove the requirement to have a turtle observer on board the dredge while performing beach nourishment activities at Sandbridge Beach. All other terms and conditions of the BO will remain in effect.

It is requested that your office consider this request and reply by February 20, 2007, in order for us to begin modifying our contract in a timely manner. If there are any questions concerning this request please contact Mr. Craig Seltzer at (757) 201-7390.

Sincerely,

Craig Seltzer

for Mark T. Mansfield
Chief, Planning and Policy Branch

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
One Blackburn Drive
Gloucester, MA 01930-2298

FEB - 7 2007

Mark T. Mansfield, Chief
Planning and Policy Branch
Department of the Army
Norfolk District, Corps of Engineers
Fort Norfolk, 803 Front Street
Norfolk, Virginia 23510-1096

Attn: Planning and Policy Branch, Craig Seltzer

Dear Mr. Mansfield,

This is in response to your letter dated January 31, 2007 regarding dredging activities proposed as part of the Sandbridge Beach nourishment project. Consultation originally occurred between the Army Corps of Engineers (ACOE) and NOAA's National Marine Fisheries Service (NMFS) in 1993. On April 2, 1993, NMFS issued a Biological Opinion (BO) which concluded that the proposed Sandbridge beach nourishment project, which involved the removal of 3.5 million cubic yards (cy) of sand from an offshore borrow site, was likely to adversely affect, but not likely to jeopardize the continued existence of any species listed as threatened or endangered by NMFS. Included with the Opinion was an Incidental Take Statement (ITS) and non-discretionary Terms and Conditions with implementing Reasonable and Prudent Measures.

Further coordination occurred between NMFS and ACOE in 2001 which resulted in revisions to the ITS. Due to funding constraints, the first dredging cycle did not occur until 2002. A second and final phase of dredging was scheduled for 2004 but due to a lack of funding has not yet occurred. The ACOE now proposes to complete the project in the spring of 2007. The final phase of dredging will involve the removal of approximately 2 million cy of sand from the offshore borrow site with placement at Sandbridge. Dredging is scheduled to take place in the spring of 2007.

As noted in your letter, recent developments indicate that the dredge operating this spring is likely to encounter small caliber unexploded ordnance (UXO) in the borrow areas for this project. As a safety precaution, the ACOE is requiring that a screen be placed over the drag head to effectively prevent any of the UXO from entering the hopper and/or being subsequently placed on the beach. The screen will be made of vertical metal bars with a gap of no more than 1.5 inches.

The ITS issued for this project requires that NMFS approved endangered species observers be on board the dredge during the period of April 1 – November 30, or whenever water temperatures are above 11°C to monitor the hopper spoil, overflow, screening and dragheads for sea turtles and their remains. Observer coverage is required to allow for the screening of 100% of dredged material. In the January 31 letter, the ACOE has requested that this requirement be waived for the 2007 dredging season as the installation of the screen on the draghead will preclude sea turtles from becoming entrained in the draghead and will prevent any sea turtles or sea turtle parts from being observed.

Sea turtles are known to be vulnerable to entrainment in large ocean-going hopper dredges. As noted above, one dredge cycle for this project has been completed. In May 2002, 1.5 million cy of material were removed from the offshore borrow site. No sea turtles were observed during this dredge cycle. While no sea turtles have been observed during dredging operations associated with this project, 59 sea turtles have been killed during dredging operations in the ACOE Norfolk district since 1994 and several others have been killed in other hopper dredging projects in the Northeast. NMFS agrees that the installation of the screening on the draghead will prevent sea turtles from becoming entrained in the draghead. For example, the hopper dredge Currituck has screening on the intake with 4" openings and studies have demonstrated that this screening effectively eliminates the potential for sea turtles to become entrained in the draghead of the Currituck.

As the screens will prevent sea turtles from becoming entrained in the dredge it is not necessary to have an observer onboard to inspect for sea turtle parts. As such, NMFS agrees to ACOE's request to remove the observer requirement for the 2006 dredging. Removing this requirement does not modify the action in a manner that causes an effect to listed species that was not considered in the April 2, 1993 Opinion and 2001 revisions; therefore, it is not necessary to reinitiate consultation. Additionally, the removal of the requirement does not alter the conclusions reached in the 1993 Opinion and 2001 revisions. Should you have any questions regarding these comments, please contact Julie Crocker of my staff at (978)281-9300 x6530 or by e-mail (Julie.Crocker@noaa.gov).

Sincerely,

Mary A. Colligan
Assistant Regional Administrator
for Protected Resources

Cc: Scida, F/NER3
McNulty, F/NER3

File Code: Sec 7 ACOE Sandbridge Beach Nourishment 2007
PCTS: I/NER/2007/00607

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
One Blackburn Drive
Gloucester, MA 01930-2298

Mark T. Mansfield, Chief
Planning and Policy Branch
Department of the Army
Norfolk District, Corps of Engineers
Fort Norfolk, 803 Front Street
Norfolk, Virginia 23510-1096

DEC 20 2007

Attn: Elisabeth Sears or Craig Seltzer

Dear Mr. Mansfield,

This is in response to your letter dated December 11, 2007 regarding the preparation of an updated Environmental Assessment for the Sandbridge Beach Erosion and Hurricane Protection Project in Virginia Beach, Virginia. The proposed project would involve beach nourishment at the Sandbridge oceanfront, an area approximately 5 miles long and 125 feet wide. The designated borrow site is Sandbridge Shoal, located approximately 3 nautical miles from the shoreline outside of Virginia's territorial sea. Approximately 1.5 million cubic yards of beach quality sand would be placed on a bi-annual cycle depending on weather conditions, availability of funding, and behavior of subsequently placed material at the project site. Your letter requested information on the presence of federally-protected species recognized by NOAA's National Marine Fisheries Service (NMFS) within the project area.

As you know, several species of threatened and endangered whales and sea turtles occur seasonally off the coast of Virginia. Federally endangered North Atlantic right whales (*Eubalaena glacialis*) and humpback whales (*Megaptera novaeangliae*) may be found seasonally in Virginia waters. North Atlantic right whales have been off the coast of Virginia from November 1 through May 31. Humpback whales feed during the spring, summer, and fall over a range that encompasses the east coast of the U.S. and may be found in Virginia waters from September 1 to April 30. Federally endangered fin whales (*Balaenoptera physalus*) are also seasonally present in the waters off of Virginia, but are typically found in deeper, offshore waters. Fin whales are likely to be present off the coast of Virginia from October to January.

Several species of sea turtles are known to be present off the coast of Virginia from April 1 to November 30 each year. Federally threatened loggerhead (*Caretta caretta*) and green (*Chelonia mydas*) as well as federally endangered Kemp's ridley (*Lepidochelys kempi*) sea turtles are present in Virginia's coastal waters, including Chesapeake Bay, mainly during late spring, summer, and early fall when water temperatures are relatively warm. Federally endangered leatherback sea turtles (*Dermochelys coriacea*), although predominantly oceanic, would be expected to occur in these waters during the same time frame. Leatherbacks are often observed feeding on jellyfish prey near the mouth of Chesapeake Bay during warm months.

Consultation on this project originally occurred between the Army Corps of Engineers (ACOE) and NMFS in 1993. On April 2, 1993, NMFS issued a Biological Opinion (BO) which concluded that the proposed Sandbridge Beach nourishment project was likely to adversely affect, but not likely to jeopardize the continued existence of any species listed as threatened or endangered by NMFS. Included with the BO was an Incidental Take Statement (ITS), which included terms and conditions as well as reasonable and prudent measures which must be completed for the ITS to remain valid. As such, as it is the understanding of NMFS that the ACOE will adhere to the terms and conditions and reasonable and prudent measures of the 1993 BO, the ITS that accompanied that BO remains valid for this project and no additional consultation pursuant to Section 7 of the ESA is required.

We look forward to continuing to work cooperatively with you and your staff on dredging projects in the Norfolk District. Should project plans change or new information become available that changes the basis for this determination, or a new species be listed or critical habitat designated, consultation should be reinitiated. Should you have any questions regarding these comments, please contact William Barnhill of my staff at (978) 281-9300 ext. 6510 or by e-mail (William.Barnhill@noaa.gov). Information regarding essential fish habitat and other NOAA trust resources in the project area should arrive under separate cover.

Sincerely,

Mary Colligan

Mary A. Colligan
Assistant Regional Administrator
for Protected Resources

cc: Nichols, F/NER4

File Code: Sec 7 technical assistance 2007 – ACE NAO Sandbridge Beach nourishment project
PCTS: I/NER/2007/08011

United States Department of the Interior

MINERALS MANAGEMENT SERVICE
Washington, DC 20240

JUN 0 2 2008

Ms. Mary Colligan
Assistant Regional Administrator
National Marine Fisheries Service
One Blackburn Drive
Gloucester, Massachusetts 01930

Dear Ms. Colligan:

The National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries) indicated in a December 20, 2007 letter to the U.S. Army Corps of Engineers (ACOE), Norfolk District (see enclosed) that the planned biannual maintenance of the Sandbridge Beach Erosion and Hurricane Protection Project (Project) in Virginia Beach, Virginia was covered under an April 1993 NOAA Fisheries Endangered Species Act (ESA) biological opinion (BO) and associated Incidental Take Statement. This BO concluded that the dredging for the Project was likely to adversely affect but not likely to jeopardize the continued existence of any ESA-listed species nor adversely modify any designated critical habitat.

The ACOE has requested authorization from the Minerals Management Service (MMS) to dredge an offshore borrow area covered under the Outer Continental Shelf Lands Act, 43 U.S.C. § 1337(k) and considered in the analysis of the BO. Consequently, the MMS is required under the ESA to consult with NOAA Fisheries to ensure that approval of the use of sand from this offshore site does not jeopardize the continued existence of ESA-listed species or adversely modify any designated critical habitat. Based on recent guidance provided by Ms. Julie Crocker of your staff, this letter serves to request concurrence from NOAA Fisheries that MMS's authorization of the use of this sand will not take or affect ESA-listed species or designated critical habitat as this authorization is purely administrative in nature. Further, the MMS also requests acknowledgement from NOAA Fisheries that MMS has met its ESA Section 7 requirements for this project.

Please provide a written response regarding this concurrence no later than 45 days from receipt of this letter. If you have any questions or require additional information, please contact Ms. Jill Lewandowski at Jill.Lewandowski@mms.gov or (703) 787-1703. We appreciate your cooperation and assistance in this matter.

Sincerely,

Judy Wilson
Acting, CED

Gregory J. Gould
Chief, Environmental Division

Enclosure

cc: Craig Seltzer, U.S. Army Corps of Engineers, Norfolk District
Renee Orr, Minerals Management Service, Leasing Division
James Bennett, Minerals Management Service, Environmental Division
Geoffrey Wikel, Minerals Management Service, Environmental Division
Jill Lewandowski, Minerals Management Service, Environmental Division

DEPARTMENT OF THE ARMY
NORFOLK DISTRICT, CORPS OF ENGINEERS
FORT NORFOLK, 803 FRONT STREET
NORFOLK, VIRGINIA 23510-1096

REPLY TO
ATTENTION OF:

April 16, 2009

Planning and Policy Branch

Ms. Mary Colligan
Protected Resources
National Marine Fisheries Service
Northeast Regional Office
55 Great Republic Drive
Gloucester, MA 01930-2276

Dear Ms. Colligan:

The U.S. Army Corps of Engineers (USACE), Norfolk District is currently preparing for the maintenance of a beach nourishment project at Sandbridge Beach, Virginia Beach, Virginia that is planned to begin in spring/summer 2010. The last beach nourishment was completed in October 2007. The upcoming project incorporates the same design criteria as the 2007 project, a 50-foot-wide berm at an elevation of 6 feet (NGVD) with a foreshore slope of approximately 1:20 for a shoreline distance of approximately 5 miles from the Dam Neck Fleet Training Center to the Back Bay National Wildlife Refuge. The USACE, acting as a lead agency, and the Minerals Management Service (MMS), acting as a cooperating/joint agency, have updated the enclosed Draft Environmental Assessment (EA) to address beach renourishment and sand borrow from Sandbridge Shoal. The shoal is located approximately three (3) nautical miles from the shoreline, outside of Virginia's territorial sea. Beach quality sand would be removed by either hydraulic cutterhead suction dredge or by trailing suction hopper dredge.

All requirements of the Section 7 consultation with NMFS regarding measures to minimize/eliminate impacts to threatened and endangered species were previously outlined in a correspondence letter from your agency dated December 20, 2007. The letter stated that the current Incidental Take Statement (ITS) and Biological Opinion (BO) would remain valid for the upcoming dredging and beach nourishment operations provided Norfolk District adheres to all reasonable and prudent measures and terms and conditions as outlined in the 2001 ITS and 1993 BO. Your office concluded that the proposed project was likely to adversely affect sea turtles, but not likely to jeopardize the continued existence of the species. In accordance with the terms and conditions of the BO for the project, if dredging occurs between May 1 and November 30, with the use of a hopper dredge, turtle deflectors will be outfitted on the draghead. The ITS issued for this project also requires that NMFS approved endangered species observers be on board the dredge during the period of May 1-November 30, or whenever-water temperatures are above 11°C to monitor the hopper dredged sand, overflow, screening and dragheads for sea turtles and their remains. Observer coverage is required to allow for the screening of 100% of dredged material.

During an archaeological remote sensing survey conducted in 2007, it was determined that the borrow area (Sandbridge Shoal) had high potential for other materials, such as small caliber unexploded ordnance (UXO). Historically, the shoal was within an area designated as a range for coastal ordnance training and military weapons experiments. As a safety precaution, the Corps has required that a screen be placed over the drag head to effectively prevent any of the UXO from entering the hopper and/or being subsequently placed on the beach; the screen is made of vertical metal bars with a gap of no more than 1.5 inches.

On January 31, 2007, the Corps requested that the requirement for endangered species observers on board the dredge be waived for the 2007 dredging season as the installation of the screen on the draghead would preclude sea turtles from becoming entrained in the draghead and prevent any sea turtles or sea turtle parts from being observed. Your office responded by letter dated February 7, 2007, and agreed that the installation of the screening on the draghead would prevent sea turtles from becoming entrained in the draghead. The letter stated it was not necessary to have an observer onboard to inspect for sea turtle parts and agreed to the Corps request to remove the observer requirement for the 2007 dredging project. Furthermore, your office stated that removal of the observer requirement did not alter the conclusions reached in the 1993 Opinion and 2001 revisions. The Norfolk District is hereby requesting concurrence with these previous agreements.

All other terms and conditions of the BO and ITS will remain in effect. It is requested that your office review the enclosures and reply by May 20, 2009, which concludes a 30-day comment period for the Draft EA. Should you have any questions as you review the document or need any additional information, please do not hesitate to call Ms. Elisabeth J. Sears of my staff at (757) 201-7766 or email to: elisabeth.j.sears@usace.army.mil. Thank you for your time and we look forward to hearing from you.

Sincerely,

Mark Mansfield

Mark T. Mansfield
Chief, Planning and Policy Branch

Enclosures

DEPARTMENT OF THE ARMY
NORFOLK DISTRICT, CORPS OF ENGINEERS
FORT NORFOLK, 803 FRONT STREET
NORFOLK, VIRGINIA 23510-1096

REPLY TO
ATTENTION OF:

April 16, 2009

Planning and Policy Branch

Mr. David O'Brien
National Marine Fisheries Service
NOAA Fisheries Habitat Conservation Division
P.O. Box 1346
7580 Spencer Road
Gloucester Point, VA 23062

Dear Mr. O'Brien:

The U.S. Army Corps of Engineers (USACE), Norfolk District is proposing maintenance of a beach nourishment project at the Sandbridge oceanfront, Virginia Beach, Virginia. Construction is expected to begin in spring/summer 2010; the last beach nourishment was completed in October 2007. The upcoming project incorporates the same design criteria as the 2007 project, a 50-foot-wide berm at an elevation of 6 feet (NGVD) with a foreshore slope of approximately 1:20 for a shoreline distance of approximately 5 miles from the Dam Neck Fleet Training Center to the Back Bay National Wildlife Refuge. The Norfolk District, acting as a lead agency, and the Minerals Management Service (MMS), acting as a cooperating/joint agency, have updated the enclosed Draft Environmental Assessment (EA) and Essential Fish Habitat (EFH) Assessment in association with beach renourishment and sand borrow from Sandbridge Shoal. The shoal is located approximately 3 nautical miles from the shoreline, outside of Virginia's territorial sea. Beach quality sand would be removed by either hydraulic cutterhead suction dredge or by trailing suction hopper dredge. By this letter and the information contained therein, the USACE and the MMS are requesting to initiate EFH consultation.

EFH is defined in the Magnuson-Stevens Fishery Conservation and Management Act as..."those waters and substrates necessary to fish for spawning, breeding, feeding or growth to maturity." The designation and conservation of EFH seeks to minimize adverse effects on habitat caused by fishing and non-fishing activities. The 1996 amendments to the Magnuson-Stevens Fishery Management and Conservation Act require Federal agencies to consult with the National Marine Fisheries Service regarding the potential effects of their actions on EFH. The project area includes the waters of Sandbridge Shoal and oceanfront of Sandbridge Beach.

The following species were designated as having a Fishery Management Plan: windowpane flounder (*Scopthalmus aquosus*), bluefish (*Pomatomus saltatrix*), Atlantic butterfish (*Peprilus triacanthus*), summer flounder (*Paralicthys dentatus*), witch flounder (*Glyptocephalus cynoglossus*), scup (*Stenotomus chrysops*), Atlantic sea herring (*Clupea harengus*), surfclam (*Spisula solidissima*), black sea bass (*Centropristis striata*), monkfish (*Lophius americanus*), spiny dogfish (*Squalus acanthias*), king mackerel (*Scomberomorus cavalla*), Spanish mackerel (*Scomberomorus maculatus*), cobia (*Rachycentron canadum*), red drum (*Sciaenops occelatus*), red hake (*Urophycis chuss*), sand tiger shark (*Charcharias taurus*), Atlantic sharpnose shark (*Rhizoprinodon terraenovae*), dusky shark (*Charcharinus obscurus*), sandbar shark (*Charcharinus plumbeus*), scalloped hammerhead shark (*Spyrna lewini*), tiger shark (*Galeocerdo cuvieri*), clearnose skate (*Raja eglanteria*), little skate (*Raja erinacea*), and winter skate (*Raja ocellata*). Those bottom habitats with mud, gravel, and sand substrate that occur within the project area are designated as EFH for the clearnose skate. Those bottom habitats with soft bottom, rocky, or gravelly substrates that occur within the project area are designated as EFH for the little skate. For the winter skate, those bottom habitats with a substrate of sand and gravel or mud that occur within the project area are designated as EFH. The NMFS designated a "habitat area of particular concern" (HAPC) for the sandbar shark but not for any other Atlantic highly migratory species (HMS) due to a general lack of scientific information detailing HMS-habitat associations. There are no management or fisheries restrictions in place in or around the project area at this time. A detailed discussion and assessment of impacts to EFH for the above species are included in Appendix B of the enclosed Draft EA.

Adverse effects on EFH species, related to dredging and construction activities will be temporary, minimal, and largely within the dredged footprints and beach nourishment areas in the surf zone. The EFH Assessment concluded that the project is not anticipated to significantly impact EFH species or habitat (including HAPC) that may be in the project area, and that the overall impact to identified species is considered negligible. Pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (PL 94-265) we request your concurrence with the conclusion of this assessment.

It is requested that your office review the enclosures and reply by May 20, 2009, which also concludes a 30-day comment period for the Draft EA. Should you have any questions as you review the attached information or need any additional information, please do not hesitate to call Ms. Elisabeth J. Sears of my staff at (757) 201-7766 or email to: elisabeth.j.sears@usace.army.mil. Thank you for your time and we look forward to hearing from you.

Sincerely,

Mark Mansfield

Mark T. Mansfield
Chief, Planning and Policy Branch

Enclosures